TECHNICAL GUIDELINES DEVELOPMENT COMMITTEE

(TGDC) MEETING

Tuesday, December 5, 2006

Greene Auditorium

NIST Gaithersburg, Maryland

(START OF AUDIOTAPE 6, SIDE A)

Mr. ALLAN EUSTIS: I have a couple of items, just administrative issues related to all of you on the committee. As in past meetings, you do not have to carry your Manhattan phone books home with you. If you just put your card with your name on top of it we will mail you all of the workbooks.

At the end of the meeting and some people are leaving early, I put on your places potential scheduling for future meetings. We will be discussing this at the end of the meeting today. You can either e-mail it to me or leave it for me or tell me these weeks are just out of, you know, there's no way you could do it.

We are going to actually explore a couple of options, either one meeting or two meeting and we may even talk about other options, but as in the past, this is just preliminary, I'm certainly going to want to hear from Secretary Gale and Sharon Turner Buie on their preferences as well and we will

get back to you on that. So, that's basically the same as we have done in other meeting but I know some people are leaving early.

I know it was a little cold in here yesterday. It's a little warmer today. Hopefully we will still stay awake. With that, I turn the proceedings over to Dr. Jeffrey.

DR. WILLIAM JEFFREY: Thank you very much and welcome to the second day of the TGDC, the seventh plenary TGDC. Again, we have a lot of work to do today including several resolutions that may be introduced.

So, first I would like to again ask everyone to please stand for the Pledge of Allegiance.

At this time i would like to turn it back over to Allan for some safety –

MR. EUSTIS: This is for the audience. Anyone who needs signing, our signers are over here stage left and they will be here during the day today. Thank you.

DR. JEFFREY: Thank you and now I would like to turn it over to Mr. Phil Greene, soon to be in New Zealand, to do a roll call and ensure that we have got a quorum.

MR. GREENE: Williams.

MR. WILLIAMS: Here.

MR. GREENE: Williams is here. Berger.
MR. BERGER: Here.
MR. GREENE: Berger is here. Wagner.
MR. WAGNER: Here.
MR. GREENE: Wagner is here. P. Miller.
MS. P. MILLER: Here.
MR. GREENE: P. Miller is here. Gale. Gale, not responding. Mason.
MS. MASON: Here.
MR. GREENE: Mason is here. Gannon.
MR. GANNON: Here.
MR. GREENE: Gannon is here. Pearce.
MR. PEARCE: Here.
MR. GREENE: Pearce is here. A. Miller.
MS. A. MILLER: Here.
MR. GREENE: A. Miller is here. Purcell.
MS. PURCELL: Here.
MR. GREENE: Purcell is here. Quesenbery.
MS. QUESENBERY: Here.
MR. GREENE: Quesenbery is here. Rivest.
MR. RIVEST: Here.
MR. GREENE: Rivest is here. Schutzer.

MR. SCHUTZER: Here.

MR. GREENE: Schutzer is here. Turner-Buie.

MS. TURNER-BUIE: Here.

MR. GREENE: Turner-Buie is here. Jeffrey.

DR. JEFFREY: Here.

MR. GREENE: Jeffrey is here. We have fourteen in attendance. That does constitute a quorum.

DR. JEFFREY: Thank you very much. Before we get started with the briefings as scheduled, are there any resolutions that plan to be introduced first thing this morning?

MR. RIVEST: Yes.

DR. JEFFREY: You've got the floor.

MR. RIVEST: Thank you. Good morning everyone. I would like to have us revisit the issue of software dependence that we discussed yesterday. I think we were close yesterday to agreement to passing a motion that would be supportive of the subcommittee's recommendation and based on informal discussions and so on.

We have a revised motion that we would like to submit because this was something that actually Paul Miller, I think drafted the final wording of and I think it reflects the

concerns of those of you who voted no to the earlier motion. If not I hope that a small modification of this would be sufficient to achieve your support on this. I feel this is an important motion for this committee but I hope that the revised version addresses the concerns of those of you who had concerns with the original wording.

Let me read it out. I don't know if Allan you want to type it as I speak or how this will – because I don't have a --. Okay, okay. Let me just read it first.

The resolution reads as follows: "Election officials and vendors have appropriately responded to the growing complexity of voting systems by adding more stringent access controls, encryption testing and physical security to election procedures and systems. The TGDC has considered current threats to voting systems and, at this time, finds that security concerns do not warrant replacing deployed voting systems where EAC Best Practices are used."

The next paragraph says: "To provide auditability and proactively address the increasing difficulty of protecting against all prospective threats, the TGDC directs STS to write requirements for the next version of the VVSG requiring the next generation of voting systems to be

software independent. The TGDC direct STS and HFP to draft usability and accessibility requirements to ensure that all voters can verify the independent voting record."

"The TGDC further directs STS and CRT to draft requirements to ensure that systems that produce independently verifiable voting records are reliable and provide adequate support for audits."

DR. JEFFREY: Thank you. Is there discussion?

MR. BERGER: Ron, let me ask some questions and I may ask Allan to put some slides up that I just gave him to give context to this. I am not sure I understand what software independence is in sufficient detail.

Specifically and this is where the slides may help, let me know if you think so. Would a implementation that's model driven and specific coding verified against a structured model qualify as software independent in your understanding?

MR. RIVEST: I'm not sure I understand your terms there. I think the question is whether an error – I mean the definition of software independence, I think is quite clear. If an undetected error in the software could cause an undetectable change in the election outcome. If you can

match those words against your use of model driven development there, I think you should have an answer.

I think the answer is probably no unless there is some sort of auditability there because merely being model driven, I think, doesn't provide the auditability that we seek here.

MR. BERGER: I guess I will ask, Allan, if you could put that presentation that I gave you up. Is that going to take a minute?

MR. EUSTIS: (Too far from mike to understand what he was saying.)

MR. BERGER: Absolutely. Let me say, I found myself up before five this morning thinking about this problem which is probably a bad personal choice. I thought that one slide that was put up yesterday by John Kelsey was absolutely brilliant in its insight and brevity. That was the slide that focused us on that interaction between the voter and getting a vote passed, verified and then indelibly recorded. I think the comment was, if we get that right, many other things in the system are tremendously helped.

With that focus of that critical element, what happens in the voting booth. The software for that on a DRE or electronic machine, is less than a megabyte. That's not

a lot of software. I have to believe we can verify and put very careful controls on that so that we can get an accurate and verified record of what the voter does in the booth in multiple ways. That's the core of my question.

From there I reach out – the object management group has done work in a number of arenas to get trusted and verified software. They have developed a robust system of model driven architecture with automated tools to very software against the structured model to implement various processes. That to me offers a very promising way forward that is ready and available.

I personally think we owe it to ourselves and to those who use these systems to see if those tools may not solve the problems we are worrying about.

MR. SCHUTZER: Let me try to address it from my point of view. First, I would like to point out that some software like browser software is even significantly smaller that what you are talking about and we are having tons of problems with ensuring the security of browser software.

The Trust the Computing Initiative is – we are all looking forward to that as we are with more of the structured work but, to be honest with you, its not here yet. I, as

the financial service industry, I can't deliver product on that yet. So, I would say that, therefore, no one is saying that the current DREs are not secure or cannot be made secure. What we are saying is that in today's state of the art we are unable to prove to someone who would challenge that DRE, that there wasn't something lurking there that was throwing the election so to speak.

An additional safeguard which is the same kind of safeguard that we use in financial services is, to do our best we can either pursue getting better, more trustworthy code, but in the meantime to have other channels besides that device upon which you can independently verify. That's the way I understand the software independent notion to be.

Independent of the software on that device you can, the user, the voter, can verify that the vote that they placed was indeed the vote they intended it to be. It's a safeguard. It doesn't substitute for continuing to make the software better, more trustworthy, more secure, etc. half of the other resolutions we have been taking about , you know, strip the operating system for modules we don't need and go to more structured forms of coding, etc.

In the meantime and particularly considering a lot of

the devices that currently are bought and being used in voting certainly are not availing themselves of anything from the Trust the Computing Initiative or any of these advanced things. I think its prudent to just to stop any naysay in an election by saying God knows i could demonstrate, you know, you could in theory do this and to illustrate well, even if you could do that we have this additional safeguard which is the verification stage. So if you look at that very top level diagram its sort of saying the voter comes in, authenticates themselves to somebody at the registrar and then go into the booth. They place their votes. They take another step independent of the DRE which allows them to verify that the vote they cast was the vote they indeed wanted to cast and then they – you sort of put to rest that issue. That's why I voted for it. I think its just a prudent thing to do.

I think over a period of time with innovation and advances in software we may eventually get to the point where, (a) the software could be proofed, and/or (b) there might be some electronic equipment. I brain stormed one the other day where are getting on the machines and checking the transaction codes and maintaining your privacy. However,

today with the here and now that you have, you really want to move forward this would be the simplest, most pragmatic way to get it done.

MR. BERGER: Dan, let me give you a quick rejoinder. As I walked in the building, I noticed a sign in the lobby that says that we can all fly with more confidence and more safely because of flight instrumentation developed with the assistance of NIST that we can rely on. I guarantee you much of that instrumentation has code in it that's both larger and more complex than anything we are talking about today. Does that mean you shouldn't take those planes this afternoon?

MR. SCHUTZER: But if you look at many of those kinds of systems they have multiple processes that are computing in parallel, separate developed. Not just redundancy but parallel paths for computation.

You could specify a voting system like that. I would say that if I were to vote – specify a voting system that built from scratch, finite state machine, two separate different machines and process developed by two different vendors and entities with all sorts of other safeguards and checks and who does the development, special clearances and

the like, I imagine I could probably come up with a voting machine like that, even today.

It wouldn't be based on COTS. It would have been stripped of just about everything but the specific operations you want and there would be some real scrutiny as to who does the development and how its done. It just doesn't seem to be a way we practically can handle that in the way we are set up to buy and purchase voting machines and the budgets we have and etc.

PROFESSOR RIVEST: I have a comment. You asked about the airline analogy which is often brought up and the airline industry has a wonderful record of developing software. They spend orders of magnitude more on their software than, I think, the voting industry is currently doing and would prospectively do.

Moreover, I think you also have the problem of just errors. If you have an error and a plane goes down, you know it. If you have an error in election and the wrong person is announced the winner, you may not know it and that's a very significant qualitative difference.

MR. BERGER: Well, let me, since Allan has it up on the screen. Allan could you jump to slide three? This is

a presentation that was given to an IEEE group by Fred Waskowicz (sic) of the Object Management Group and I just want to make the committee aware of this work.

There is a model driven architecture. It's model based, standard driven, tool supported engineering approach and, Allen, if you could go to the next slide. Essentially what happens is a process is abstracted and then automated against open standards.

I really want to go to slide six if you could just jump ahead there. The point is that, and Ron I think because of what you just said, we need to focus the problem on specifically that getting the voter's vote verified and unalterably out of the voting booth. That, I think is a constrained problem that is much more tractable.

A computer independent model can then be given over to vendors to do platform specific implementations and what this is showing the work over a number of years now by the Object Management Group has developed a set of tools to validate those implementations both as robust to themselves and valid to the model.

MR. SCHUTZER: Steve, i am very familiar with the Object Management Group and the model driven architecture.

Indeed we have members and I did too. We follow that. We have actually even used it in some cases modeling the requirements and so forth. We haven't yet reached a stage where from that specification we automatically generate code that then is untouched by human hands and therefore free of error.

I might add that that code rides upon general purpose processes and operating systems not about doing an odd design which is inherently full of problems. I might say even in the airline industry, many times when there is a crash they will have an independent recording and they still can't determine what caused the crash.

I would say that life isn't perfect and, of course, the added complication as I pointed out is that we can build a lot of error control checking in our financial processes and in our airline industry because we don't have the problem of having to maintain the transparency. We can carry through the details of that transaction or identification of all of the parties involved.

PROFESSOR RIVEST: I would point out that there is nothing that requires the operating system, general computing architecture within the DRE. That's one of the

values of constraining the problem in that critical step.

MR. SCHUTZER: I agree. That's what i was trying to say before. If you had your druthers, if money was no object, if time was no object, then what I would probably do is build an RFP that would be a model driven, finite state device, with a very focused operating system. It doesn't do anything else but display ballots and take votes. I would order safeguards. I'd build that thing and it would probably be very small, very tight code. It would probably be pretty damn secure.

I don't know, even then, you know, the experts will tell me that even then they may have some trouble provably making sure its secure. I bet it would be a heck a lot of better, but now what you have to do is prove, you know, you now have to change your procurement procedures.

You have to do like the military, like what I did when I was at DOD. I'll have to build, specify my own specific operating system for that missile, go to some vendors, make sure they've got the appropriate clearances so I can be sure that they can be trustworthy and not traitors or trying to undermine things. Probably (undecipherable) at least. So, I'm saying that kind of procurement practice that I did

when I was in DOD is not the kind of procurement practice that we see today because of all the constraints that we have in the voting industry.

So, I am not disagreeing with what you are saying considering the practical constraints of what we are living with and the machines that are out there. We are not going to be asking anybody to get rid in the next two to five years. This is still relatively a pipe dream for that environment.

MR. BERGER: Let me, and I hope the committee is finding this debate helpful. I am personally finding it valuable.

Let me put another fact before the committee. While I was looking at that code I took occasion to notice the date on which the programmer finished it and this code will come for state certification in early 2007. Its being submitted now.

That time frame is two and one-half to three years. So I am mindful of the time line that Commissioner Davidson showed us yesterday and the issues we are debating today, at the earliest will come up for a final EAC vote for adoption in March of 2008. If you assume some reasonable time for a vendor then to implement to that standard, add the time

to get that certified and to state certification, we are talking 2011 at the earliest.

That's yet then to be put before local jurisdictions or selection contracting and delivery. Dan I have to say we can mature our processes in that time.

MR. SCHUTZER: We have one other problem, but that's 2011. I'm worried about, you know, what you could do (undecipherable) to that. We have one other problem which is the size of the market place and the nature in which the equipment is procured.

By that, let me say, if it were that we were a nation where we decided we would build a universal voting machine that would be legislated for every municipality, where we didn't have each individual municipality have their own separate rules and way of doing things. Its possible you might have largest enough target to make it economical to do what you are talking about because we would be talking about a reasonably large number still no where near, you know, the kinds of numbers of ATMs and so forth that we have but a reasonably large number that might make it worthwhile for someone to invest those kinds of dollars to build that kind of machine.

Instead of that what we have is we have a federation of independent entities buying machines under some general guidelines in terms of standards. I would say it would be extremely hard to make that an attractive enough marketplace. The only thing you can hope for is that the general problem of computing, like to solve my problem in financial services and so forth, eventually gets solved by the technology you have and that's still results in general computing devices which is a much harder problem than this industry could take advantage of.

MR. BERGER: I have to say I agree with you on all the factors that fight us. Exactly because of those, I think if we move to a model driven architecture at critical points in the system, not defining the whole system but critical elements such as that of making sure we get a voter's vote recorded and verified and unerasably, unalterably delivered from that to the rest of the system. Under model driven architecture I think we can see economies of scale. I can also see verification tools developed to verify to that model.

MR. SCHUTZER: I'll give you one last argument based on your knowledge of the time line, okay. So I will give

you my experiences. In 1995 the internet became commercialized sufficient to be of interest to financial services (undecipherable) and the like. We saw a lot of pitfalls in the security of that which I might add could have been addressed and, in fact, we developed technology to address that, to secure payments, etc. None of which saw the light of day, even today. All those ideas even though it was closer in than what you are talking about, did not see the light of day because of practical marketplace circumstances.

Now, finally, you know, we are starting to introduce some of them. I can show you even stronger things that were done further back. So, when you start talking about how long it really takes for an idea in concept to really reach the marketplace in full productization (sic) I would say you are not staring at 2011, you are staring at 2020.

MR. BERGER: I have to agree with you entirely. Let me say and I will put it before the committee for following discussion. One of my disappointments in our debate so far is that we haven't talked about many very doable things we could do to improve the system for the next several elections. We are totally focused in our debate yesterday on things

out in say, 2020. That's a long way away.

MS. QUESENBERY: If a few of us could chime in who aren't as deeply involved in this discussion. First of all this sounds to me like a discussion that should be happening at the CRT committee. I don't hear a proposal from the CRT committee for us to consider. I don't really, and it's a fascinating discussion, but I don't understand where our discussion of a particular approach to coding comes into this discussion at this point. I'm really quite confused about that and I also, maybe to get this back to something a little more relevant, my question for anybody that wants to answer it, is is there any conflict between adopting a model driven architecture and software independence?

MR. SCHUTZER: Well, there's no conflict at all. One shouldn't exclude the other.

MR. BERGER: If I could answer. What I said was that model driven architecture does not imply software independence which is what I think you asked.

MALE SPEAKER 1: From your resolution then it would be proscribed, right?

DR. JEFFREY: Actually if I could have David jump here who's been trying to say something for a few minutes.

MR. WAGNER: If i could answer Whitney's question, I do not see any conflict here. STS considered many of these issues at great length and came to a compromise which recognized the need for innovation and, in fact, we passed with unanimous consent a resolution yesterday to permit innovation class which would permit exactly these kinds of innovative approaches to be proposed and considered in the standard. I don't see any conflict here between the kind of approach that Steve Berger is talking about and the SI resolution in front of us.

DR. JEFFREY: If I could ask Allan to put up the draft resolution then. Let's focus back in on the resolution on the table. While he is doing that I will also remind people as we speak, since I'm the one who usually violates it, please give your name first. This is Bill Jeffrey. The rest of you have done very, very well and I will try to learn.

If you could load that up as big as possible and then if there is additional discussion on the content of the resolution on the table.

MR. BERGER: I'll just say now so David can be thinking about it, I personally would like to see some words to the effect of what David just said in the resolution,

just specifically point out that this is supported by the committee.

MR. WAGNER: I don't believe that's necessary. I believe we already have those words in the innovation class resolution which already passed unanimously. So I believe that's already a done deal.

MS. MASON: Thank you. Tricia Mason at the United States Access Board.

I think after yesterday's conversation and just me being new yesterday and after much consideration and talking to people off line, I think its important that we reconsider this. I'm really in favor of the fact that the human factors committee has been included in that to ensure that this sort of system will be accessible to all users. So, just on the record that I am now considering a change of heart.

DR. JEFFREY: There is a resolution. I should ask is there a second to this resolution?

MS. QUESENBERY: I second it.

DR. JEFFREY: Okay. Any further discussion before I call for a vote? Okay, let me ask is there any objection to the unanimous consent?

Let me ask again, is there any objection to unanimous

consent?

Hearing no objection this has been adopted by unanimous consent.

Well, thank you very much and now, David, you're back up. I am not going to charge that against your thirty minutes.

MR. FLATER: Okay. So, this is an ideal time to finish this discussion. It will then be –

DR. JEFFREY: Roughly 9:30. Again, there is two hours at the end of the day set for resolutions. I think we have covered probably pieces of that as well.

MR. FLATER: Okay. The two topics that were on my original list that I could cover at this point were, this about conformity assessment and scope of testing and a discussion about the California volume reliability testing protocol. I believe we talked enough about the reliability testing protocol yesterday and the discussion of reliability. I didn't hear any opposition to the direction that we need to do something similar to that in the testing so I'm just going to use the remaining time to talk about conformity assessment an scope of testing.

We had a CRT tele-con about this. Suffice it to say we did not reach consensus on this issue. What I would like

to do is give a very brief presentation of the ideas as I have them here and then open it up to discussion.

What the test labs are accredited by NAVLAP (sic) to do is conformity assessment. It has been defined as a conformity assessment process. This means that they are assessing the adherence of the product to requirements in the guidelines. It also means anything no specified in the guidelines, is irrelevant unless it is required to test things that are specified. This process strives for maximum objectivity, repeatability and reproducibility. It is an assessment measurement process. In the even that the test lab is going to have a negative finding about something in the system, that finding has to be defensible in terms of a specific, at least one, specific requirement that can be cited out of the guidelines to show that the system does not conform.

The issues that have arisen with respect to this. Firstly, the testing volume of VVSG 05 already has things in it that require testing of vendor specific functionality that is not traceable to any requirements in volume 1. This is not conformity assessment.

Additionally, many folks throughout this discussion,

the production of the standards, have at different times made assumptions about how various problems can be solved simply by saying, well, we will require the test lab to do the following. The EAC may place additional requirements on what the test labs may do, however, for the integrity of the guidelines themselves, the requirements that appear in the testing standard of the guidelines are strictly scoped to conformity assessment to the other volumes of the guidelines. That is simply a matter of the integrity of the guidelines.

Additionally there has been pressure for federal testing to do more for the states. There are two things that we can do with regard to state specific requirements. Either we can turn them into conformity assessment by expanding the product standard to include these. This is possible in a few cases but clearly not in all cases.

We have over 50 different jurisdictions with different election law. There is no way we can feasibly unify all of these into one gigantic product standard.

The other thing is to observe that it is the case now, it will be a case that has always been the case. States can contract with test labs or whomever they want for that

matter, to test whatever requirements they like. There is no conflict between having a test lab having a contract to perform conformity assessment as they have been accredited to do and a contract with someone else to test state specific requirements or any other requirements and they can optimize this task to reduce the cost.

However this extra testing that is done is outside the scope of the guidelines. For the integrity of the guidelines, we can't be thinking that we will roll requirements into the testing standards that are not traceable to the product standard.

At that point I open it up for discussion.

DR. JEFFREY: Any comments or questions for David? Thank you David.

MR. FLATER: Our conference all was longer than that.

MS. QUESENBERY: See what clear plain language gets you.

DR. JEFFREY: Excellent. Thank you very much David and I definitely appreciate all of the hard work.

Next up is Sharon Laskowski. We are now shifting gears to the Human Factors and Privacy Subcommittee preliminary report.

MS. LASKOWSKI: Good morning Dr. Jeffrey, committee members. I'm going to be talking about the work that the Human Factors and Privacy Subcommittee has been doing in the past months.

First let me give you an overview of what I'll be talking about. My talk is in three parts. First, I'll be talking about some mainly small corrections but also some more major clarifications that we've made in the usability, accessibility and privacy section of the VVSG 05 in preparation for the next iteration of the VVSG.

What I will do, I will go through sequentially those changes in the most recent draft of the VVSG that's in your handout. That will probably take most of the time. We'll see how it goes. It depends on how many questions and issues come up. It hard to say.

Then I'll report on the two research projects that we are working on to support further edits for this next iteration of VVSG and then I'll go over a number of issues that have come up and specifically these are going to be topics that we want to do further analysis and research on in support of further additions to the VVSG.

As I said, I am going to be using the HFP section in

your binder to go through. That's marked as chapter 3 for this discussion.

The text as we go through it in some places you will notice double brackets. Those are comments that we put in recognizing some issues we had or changes we made. As I go through my slides, pointing out each point I want to discuss, if I put in a red asterisk at the beginning of the title that indicates that this is a change in policy approach rather than just a technical fix.

If we open our binders to section 3.13. While you are doing that let me just make a comment. One of our resolutions has talked about improving the usability of the document, 10-5 and John Wack yesterday alluded to this. We do have a new word template that has requirements of that are clearly indicated with arrows and the three levels of sections, one is the volume. The second number is the chapter. The third number is the section and then, as we get to a requirement, we've lettered those requirements accordingly down to levels. The format is usually followed by a discussion.

In the most recent version you have here, I wanted to use the most recent draft so this is actually an HTML version of something that was in the Word document and the VVSG

document itself is missing a couple of the most recent updates. That's why I'm using that.

So, this is chapter 3 in the newest version. I guess its going to be chapter 6 of the second volume, something like that. Its neither here nor there for the purposes of this discussion.

What we've tried to do is have much clearer formatting. (Undecipherable) is feasibly achievable, that is we've used plain language. That's my one joke in the talk. Whitney got it.

This first topic, I don't think its controversial, but there seemed to be some confusion about what HAVA requires versus what the VVSG requirements are. In our introduction we put together a table, a little discussion making that distinction, that the VVSG is a set of highly detailed technical requirements issued by the EAC in support of the broad HAVA goals and these requirements apply to only voting equipment and not to procedures in the polling place, etc.

We've put together a little table, I've summarized it in the slides that basically says, outlining kind of the scope and the level of the VVSG versus the level of HAVA. Who enforces HAVA, who enforces VVSG, etc. Of course that

isn't quite right but who approves the VVSG, it being the EAC.

To make that distinction, we liked the section enough that we're going to recommend that it goes perhaps in introductory materials further up in the requirements volume. Any discussion?

Please identify yourself.

MR. GANNON: Under the characteristics of scope and you list the VVSG as covering voting equipment. That oftentimes seems to imply hardware where in fact the VVSG, I think is much broader than that. From my perspective we need to talk about voting systems.

MS. LASKOWSKI: Okay. I guess we should refer to the glossary and I don't have a glossary handy. We have a glossary expert here. Dave do you want to make a couple of comments versus terminology? We can make that, I think we can just check that carefully.

Do we need more discussion than that? We can just check that more carefully or we can discuss vocabulary a little further. Its up to you Patrick.

MS. QUESENBERY: I think we should take that as a good enough. We've been all struggling as acronyms have

changed and terminology has changed to make sure that we are up to date and I assume that there will be an editorial passed to make sure that we are in sync about all of this.

MS. LASKOWSKI: Yes, we will make a note of it. Any other discussion?

Let's turn to section 3.2.1. This is a section on overall performance metrics. I haven't, it's a new section, but let me make the point that we put in it because it this is going to be on research that we are doing over the next several months. This is really a place holder for the benchmarks to give you an idea of what the structure of the benchmarks for performance requirements is going to look like.

We envision all the subject to our research. This may change slightly that we'll talk about overall effectiveness. The system shall achieve an overall accuracy rating (undecipherable) and we will calculate that benchmark as measured by a very specific protocol that we are developing now.

Similarly for efficiency, time to vote, overall satisfaction with a specific subjective satisfaction, questionnaire standardized in the protocol and also, a

measure of how many assists the voter needs in the usability tests performed under the protocol to certify a system.

MR. SCHUTZER: This is what we were discussing yesterday in terms of the human interaction and the measurements of –

MS. LASKOWSKI: It definitely a subset of that discussion, yes.

MS. QUESENBERY: We'll hear a little more about the progress of that research later, but it isn't done so we can't put the numbers in yet.

MS. LASKOWSKI: But I wanted to at least give you a flavor of what those requirements would look like.

MR. BERGER: I'm just a little curious of a little more clarification on the overall effectiveness topic. So, you've got the equipment but you've also got issues of ballot design and so on too that come into play for the ability, the accuracy –

MS. LASKOWSKI: Yes, I'll give you a little hint about what our protocol looks like. So, what our plan is to ask a vendor when a machine is submitted is here is a standard test ballot. Do your best. Make this the most usable ballot design you can and they have some standard ballot templates

that look very similar across states figuring that they want to do their best job. That's how we have kind of controlled for that.

MR. SCHUTZER: Ultimately, as we start learning in this and doing this testing, I know its early in the game right now but eventually, we might have things to say about the guidelines in terms of how big boxes have to be and many other sort of things that would –

MS. LASKOWSKI: Absolutely.

MS. QUESENBERY: We've worked to try to make as many performance – make many of the departments performance based as possible because we think that leaves it the most open to cross platforms and cross-different codes of input devices. However, there are places where we know some very specific things from prior human factors research and we have included – the design guidelines that were in the VVSG 2005 are still there and they are noted by class of systems, whether it applies to a touch screen or to paper or to what kind of input that applies to.

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PROFESSOR RIVEST: Do we know the rationale for the original language providing this authorized deactivation capability?

MS. LASKOWSKI: If I reconstruct, if my memory serves me correctly, I think some of the motivation was that on some of the optical scan precinct counters, the error messages were rather ambiguous or there wasn't much of a screen to say what those message were. So, rather than – we have Donetta wanting to make a comment. Do you want to comment on that Donetta?

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correct?

MS. QUESENBERY: The voter is still allowed to make the choice to submit a ballot even after being notified of errors. That's the voter's choice.

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MS. LASKOWSKI: The way it stands now, what we put in this requirement and if you look at 222b, for under voting, that is still in there. The authorized election official can deactivate this capability entirely. So its still in there.

MR. GANNON: What is the reason for leaving it for under voting and taking it out for over voting?

MS. LASKOWSKI: I think in our HFP's interpretation is that over voting is not allowed, for example, for DREs.

MR. SCHUTZER: I'm just trying, I mean, I'm probably not the best to articulate this but, there is a distinction

between the two. Somebody really can't vote, you know, for two people for the same office. It is entirely possible that their intent was just to vote for certain things on the ballot and not other things. It's a little less clear that you can really know for sure that person when they left really didn't intend on the vote.

MS. LASKOWSKI: Over voting means you vote for that contest doesn't get counted at all.

MS. QUESENBERY: I would also note that what we are talking about here is on paper op-scan ballots because an editable interface, that is an electronic interface, has the ability to manage this in a much different way than a paper ballot does. So we split the two because the feedback and notification to the voter is so different. A computerized interface can actually prevent an over vote and can give you an instant notification of an under vote which you can change immediately without having to remark your whole ballot.

MS. DAVIDSON: That's not clear here that its just for optical scan, is it. I mean, that's the question I have because, yes, you are absolutely right.

MS. LASKOWSKI: Yes, it is. Its under section 3.222

which is non-editable interfaces. So that would be for paper op-scan.

MS. DAVIDSON: Sharon, I think there's a heading missing because when we get to 3.221, editable interfaces has a heading and I think we've missed a heading which is causing some of the confusion.

MS. QUESENBERY: I don't want to get us dragged down in details. A lot of what we have here is details. We are sort of bringing these up now because there are things that we want to make sure that you have time to look at and read before they come to you as requirements to be voted on and to make sure that if there is any feedback that either we're off course and need to be rethinking things we've done or there are issues that we haven't considered. So we are not going to vote on these requirements today. This is really for the committee to help HFP write them better.

MS. LASKOWSKI: Thank you Whitney, well said. Is there any feedback for us to go back and investigate this further or to consider other changes? Then this is probably very similar to what you will see when we vote on the standard but feel free to e-mail us or call or attend a committee meeting if you –

MS. QUESENBERY: The other thing I would say that also in the binders are some white papers. The procedure we used to work on this at HFP was that the NIST staff prepared a very short white paper that sort of laid out the issues and we've preserved that because that's, rather than you having to listen to hours of audio tape that seemed like it boiled it down to the issues for you to think about.

MS. LASKOWSKI: In section 3.222d, in conjunction with CRT we added a marginal remarks requirement.

First a marginal mark is meant – let me just read from the discussion. The purpose of this requirement is to provide more certainty about the handling of poorly marked ballots. If a given candidate or option is clearly marked as chosen or left completely unmarked, there is no ambiguity to resolve. Each vendor should define a gray zone with respect to location, darkness, etc. in which marks will be actively flagged as ambiguous. This is what this first do. So that if a marginal mark is detected, the tabulator will return the ballot to the voter, provide feedback to the voter identifying where the marginal mark was detected and allow the voter to either correct the ballot or submit it as is without correct. Any discussion?

PAUL MILLER: Has any discussion been given as to the methodology for determining what a marginal mark is?

We had a CRT tele-con about this. Suffice it to say we did not reach consensus on this issue. What I would like to do is give a very brief presentation of the ideas as I have them here and then open it up to discussion.

What the test labs are accredited by NAVLAP (sic) to do is conformity assessment. It has been defined as a conformity assessment process. This means that they are assessing the adherence of the product to requirements in the guidelines. It also means anything no specified in the guidelines, is irrelevant unless it is required to test things that are specified. This process strives for maximum objectivity, repeatability and reproducibility. It is an assessment measurement process. In the even that the test lab is going to have a negative finding about something in the system, that finding has to be defensible in terms of a specific, at least one, specific requirement that can be cited out of the guidelines to show that the system does not conform.

The issues that have arisen with respect to this. Firstly, the testing volume of VVSG 05 already has things

in it that require testing of vendor specific functionality that is not traceable to any requirements in volume 1. This is not conformity assessment.

Additionally, many folks throughout this discussion, the production of the standards, have at different times made assumptions about how various problems can be solved simply by saying, well, we will require the test lab to do the following. The EAC may place additional requirements on what the test labs may do, however, for the integrity of the guidelines themselves, the requirements that appear in the testing standard of the guidelines are strictly scoped to conformity assessment to the other volumes of the guidelines. That is simply a matter of the integrity of the guidelines.

Additionally there has been pressure for federal testing to do more for the states. There are two things that we can do with regard to state specific requirements. Either we can turn them into conformity assessment by expanding the product standard to include these. This is possible in a few cases but clearly not in all cases.

We have over 50 different jurisdictions with different election law. There is no way we can feasibly unify all

of these into one gigantic product standard.

The other thing is to observe that it is the case now, it will be a case that has always been the case. States can contract with test labs or whomever they want for that matter, to test whatever requirements they like. There is no conflict between having a test lab having a contract to perform conformity assessment as they have been accredited to do and a contract with someone else to test state specific requirements or any other requirements and they can optimize this task to reduce the cost.

However this extra testing that is done is outside the scope of the guidelines. For the integrity of the guidelines, we can't be thinking that we will roll requirements into the testing standards that are not traceable to the product standard.

At that point I open it up for discussion.

DR. JEFFREY: Any comments or questions for David? Thank you David.

MR. FLATER: Our conference all was longer than that.

MS. QUESENBERY: See what clear plain language gets you.

DR. JEFFREY: Excellent. Thank you very much David

and I definitely appreciate all of the hard work.

Next up is Sharon Laskowski. We are now shifting gears to the Human Factors and Privacy Subcommittee preliminary report.

MS. LASKOWSKI: Good morning Dr. Jeffrey, committee members. I'm going to be talking about the work that the Human Factors and Privacy Subcommittee has been doing in the past months.

First let me give you an overview of what I'll be talking about. My talk is in three parts. First, I'll be talking about some mainly small corrections but also some more major clarifications that we've made in the usability, accessibility and privacy section of the VVSG 05 in preparation for the next iteration of the VVSG.

What I will do, I will go through sequentially those changes in the most recent draft of the VVSG that's in your handout. That will probably take most of the time. We'll see how it goes. It depends on how many questions and issues come up. It hard to say.

Then I'll report on the two research projects that we are working on to support further edits for this next iteration of VVSG and then I'll go over a number of issues

that have come up and specifically these are going to be topics that we want to do further analysis and research on in support of further additions to the VVSG.

As I said, I am going to be using the HFP section in your binder to go through. That's marked as chapter 3 for this discussion.

The text as we go through it in some places you will notice double brackets. Those are comments that we put in recognizing some issues we had or changes we made. As I go through my slides, pointing out each point I want to discuss, if I put in a red asterisk at the beginning of the title that indicates that this is a change in policy approach rather than just a technical fix.

If we open our binders to section 3.13. While you are doing that let me just make a comment. One of our resolutions has talked about improving the usability of the document, 10-5 and John Wack yesterday alluded to this. We do have a new word template that has requirements of that are clearly indicated with arrows and the three levels of sections, one is the volume. The second number is the chapter. The third number is the section and then, as we get to a requirement, we've lettered those requirements accordingly down to levels.

The format is usually followed by a discussion.

In the most recent version you have here, I wanted to use the most recent draft so this is actually an HTML version of something that was in the Word document and the VVSG document itself is missing a couple of the most recent updates. That's why I'm using that.

So, this is chapter 3 in the newest version. I guess its going to be chapter 6 of the second volume, something like that. Its neither here nor there for the purposes of this discussion.

What we've tried to do is have much clearer formatting. (Undecipherable) is feasibly achievable, that is we've used plain language. That's my one joke in the talk. Whitney got it.

This first topic, I don't think its controversial, but there seemed to be some confusion about what HAVA requires versus what the VVSG requirements are. In our introduction we put together a table, a little discussion making that distinction, that the VVSG is a set of highly detailed technical requirements issued by the EAC in support of the broad HAVA goals and these requirements apply to only voting equipment and not to procedures in the polling place, etc.

We've put together a little table, I've summarized it in the slides that basically says, outlining kind of the scope and the level of the VVSG versus the level of HAVA. Who enforces HAVA, who enforces VVSG, etc. Of course that isn't quite right but who approves the VVSG, it being the EAC.

To make that distinction, we liked the section enough that we're going to recommend that it goes perhaps in introductory materials further up in the requirements volume. Any discussion?

Please identify yourself.

MR. GANNON: Under the characteristics of scope and you list the VVSG as covering voting equipment. That oftentimes seems to imply hardware where in fact the VVSG, I think is much broader than that. From my perspective we need to talk about voting systems.

MS. LASKOWSKI: Okay. I guess we should refer to the glossary and I don't have a glossary handy. We have a glossary expert here. Dave do you want to make a couple of comments versus terminology? We can make that, I think we can just check that carefully.

Do we need more discussion than that? We can just check

that more carefully or we can discuss vocabulary a little further. Its up to you Patrick.

MS. QUESENBERY: I think we should take that as a good enough. We've been all struggling as acronyms have changed and terminology has changed to make sure that we are up to date and I assume that there will be an editorial passed to make sure that we are in sync about all of this.

MS. LASKOWSKI: Yes, we will make a note of it. Any other discussion?

Let's turn to section 3.2.1. This is a section on overall performance metrics. I haven't, it's a new section, but let me make the point that we put in it because it this is going to be on research that we are doing over the next several months. This is really a place holder for the benchmarks to give you an idea of what the structure of the benchmarks for performance requirements is going to look like.

We envision all the subject to our research. This may change slightly that we'll talk about overall effectiveness. The system shall achieve an overall accuracy rating (undecipherable) and we will calculate that benchmark as measured by a very specific protocol that we are developing

now.

Similarly for efficiency, time to vote, overall satisfaction with a specific subjective satisfaction, questionnaire standardized in the protocol and also, a measure of how many assists the voter needs in the usability tests performed under the protocol to certify a system.

MR. SCHUTZER: This is what we were discussing yesterday in terms of the human interaction and the measurements of –

MS. LASKOWSKI: It definitely a subset of that discussion, yes.

MS. QUESENBERY: We'll hear a little more about the progress of that research later, but it isn't done so we can't put the numbers in yet.

MS. LASKOWSKI: But I wanted to at least give you a flavor of what those requirements would look like.

MR. BERGER: I'm just a little curious of a little more clarification on the overall effectiveness topic. So, you've got the equipment but you've also got issues of ballot design and so on too that come into play for the ability, the accuracy –

MS. LASKOWSKI: Yes, I'll give you a little hint about

what our protocol looks like. So, what our plan is to ask a vendor when a machine is submitted is here is a standard test ballot. Do your best. Make this the most usable ballot design you can and they have some standard ballot templates that look very similar across states figuring that they want to do their best job. That's how we have kind of controlled for that.

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the ballot to the voter, provide feedback to the voter identifying where the marginal mark was detected and allow the voter to either correct the ballot or submit it as is without correction. Any discussion?

PAUL MILLER: Has any discussion been given as to the methodology for determine what a marginal mark is?

MS. LASKOWSKI: I'll have to defer to David Flater at CRT.

MR. FLATER: We actually had discussions with ITAA, the members of ITAA and the representatives about this issue of how do we specify these kind of marks. It is going to depend on the equipment, different equipment detects marks in different ways.

The specification of what constitutes a marginal mark or the area of uncertainty does have to come from the vendor. Now we know that there is a certain range of reliably detectable marks. In the discussions that we had it seems to be the case that all the different technologies out there have no problem detecting a nice thick horizontal line made within the voting target. So, we are talking about marks that are fuzzier than that.

Here's the thing, within the marginal zone we are

getting into things like calibration limits and whatever else could influence you. We know that the boundary of where you go from marginal to non-marginal is going to depend on calibration but its not germane to the issue, if you will. If you are at the upper end of this boundary where ever its calibrated, either its clearly a vote or its marginal. If its marginal, we'll give it back to the voter for clarification.

If its at the lower end of this range, regardless of how its calibrated or detected, either its clearly a non-vote or its something that goes back to the voter for clarification. The important thing is that we have eliminated the possibility of the voter accidentally getting a ballot into the ballot box where their intent is ambiguous. Does that answer your question?

MR. SCHUTZER: Is the intent that this has some kind of equipment age or is this just people being trained how to read this to detect this?

MR. FLATER: I'm sorry, I don't understand the question.

MR. SCHUTZER: I'm reading here, it says that the precinct based tabulator shall be able to identify a ballot

containing marginal marks. So I assume you are saying the equipment has to be designed. Not someone is going to read this and see someone's vote.

MR. FLATER: The discussions that I had with vendor reps suggested either that their equipment already does this or that its going to do this. No one has yet got up in my face and said our equipment can't do this no way, no how.

It seems to be an issue – this originally came up in questions that I raised about how do we define reliably detectable marks. At the time I wasn't even thinking about marginal marks. The feedback that came back was essentially, well, you must think about marginal marks because there is no magic dividing line between clearly a vote and clearly a non-vote. Its going to depend on a lot of things. So if you want elections with high integrity, the right thing to do is to avoid allowing marginal marks to make their way into the ballot box as much as you can.

MR. SCHUTZER: No, I can understand how equipment, the same type of equipment you are using to count it in the first place can certainly give you some feeling as to whether this has some ambiguity in the marks, but what I understand it

would be some kind of change of procedure. People right now, they mark a ballot and hand it in. They won't put it through a device to see, will they?

MS. QUESENBERY: I would say two things. This is a section that moved to HFP from CRT because it seemed to relate to the voter and we've been trying to consolidate. I don't think its anything radically new. I do hope that what it does, I know that, I will assume that every, but every election jurisdiction I have looked at has guidelines for how the candidates committee interprets ambiguous ballots. Hopefully this will reduce the number of those that they have to handle. For once we can say that HFP is trying to help election officials.

MS. LASKOWSKI: Okay, we have done some preliminary research on plain language some of which has now found its way into section 3.2.3 - cognitive issues. We added some plain language requirements and two others that I will talk about. So let me just go through those.

Let me first say that the plain language requirements were based on best practice in general not on voting specific guidelines or experiments. I'll say a few words about research in this area later on in the presentation.

So, if we look at 3.2.3, starting at C.1 that starts with clarity of warning. I'm not going to, I'll summarize some of them but let me just read the first one so you get kind of an idea of where we are going with this.

Most of these are shoulds because there is sometimes always the case where it might be – they are brand new is one reason and –

MS. QUESENBERY: There is no absolute test for it. Its not a metric you can pass. There's always a gray area.

MS. LASKOWSKI: We put them in because they are testable by expert review. However, sometimes you always can't guarantee that is the clearest language.

MR. SCHUTZER: Well, you could in theory test it by presenting to a number of people in a test case and see if they understood what it meant.

MS. QUESENBERY: There are two things. One is, we'll hear later about some of the research we are doing to actually validate some of these. We actually are continuing the work beyond best practices and actual human performance test.

The other is that even our experts caution that you might say always use active voice but sometimes there's a

case where not using active voice is actually clearer and we didn’t want to create a guideline that prevented better design.

The only thing I would just like add is that these are in the general usability section because we felt that they are not, although they address cognitive issues, they are not specifically a cognitive disabilities issue. They are good for everyone and will improve everyone’s ability to understand what they are doing as they vote.

MR. WILLIAMS: I think it would be good for this committee.

MS. LASKOWSKI: Let me just read the first one so you get kind of a gist of it and I’ll summarize the others. Warnings and alerts issued by the voting system should clearly state the nature of the problem, whether the voter has performed or attempted an invalid operation or whether the voting system itself has malfunctioned in some way and a set of responses available to the voter.

For example, in the case of equipment failure, the only action available to the voter might be to get assistance from a poll worker. I should also point out that we have a whole report available that has lots of examples of each

one of these guidelines.

MALE SPEAKER 2: Does the plain language requirements tell vendors to avoid using election jargon? In my personal experience from testing equipment, I've seen –

MS. LASKOWSKI: Simple vocabulary is –

MALE SPEAKER 2: For instance, you say the word over vote in notification to voters –

MS. LASKOWSKI: Well, that's actually a very good question.

MALE SPEAKER 2: For instance, machines saying in a touch screen review screen saying if you do not, you know, if you have an under vote and if you don't correct this your vote will not count or something like that.

MS. LASKOWSKI: I have two points there. That's a very good question. We do have requirements c.3 on simple vocabulary. Common words avoid technical or specialized words that the voters are not likely to understand. However, you have pointed out some specific kind of voting jargon that's kind of widespread and you might think that perhaps voters do understand it. Those are some of the research issues we are exploring when I talk about voter specific

research for plain language.

We don’t necessarily know which is the better way to say it with respect to voters understanding. If it’s a voter specific, ballot specific kind of terminology.

MR. SCHUTZER: In some cases more of an interactive graphical style might perhaps be better. For example, if you are trying to alert me that I over voted, you know, if you had something in red where on the line where I voted for two things and you could say, you know, only place one vote or under voting the same way that might be more helpful.

MS. LASKOWSKI: We do have a requirement that talks about sort of standard colors for things like alerts in red, etc. but you still need to be redundant obviously because of color blind issues and the like.

MS. DAVIDSON: It doesn’t say it’s the only way to notify somebody.

MS. QUESENBERY: Just that if you use words, here are some guidelines for using those words.

MS. LASKOWSKI: To quickly summarize, we have c.2 state the condition first then the action to be performed, simple vocabulary. Start each instruction with a new line. Use the positive rather than telling voters what not to do.

Use the imperative rather than passive voice instructions. Avoid use of gender based pronouns.

E.4 is a specific ballot design. The voting system shall provide the capability to design a ballot with a high level clarity and comprehensibility because its really hard to separate the language from the ballot design itself and the instructions because they are all part of placement of instructions and support, etc.

Specifically we added some requirements such as the voting system should not visually present a single (undecipherable) spread over two pages or two columns. It's a should. So its something to strive for. Sometimes due to the constraints of the ballot you can't always do it.

E.2 - the ballot shall clearly indicate the maximum number of candidates for which one can vote for within a single contest.

E.3 - consistent relationship between the name of a candidate and the mechanism used to vote for that candidate.

MS. QUESENBERY: I'm sorry that's a carry over. That the same as in –

MS. LASKOWSKI: You're right but we reorganized it under the context of the plain language.

I don’t have a copy of VVSG 5 next to me either so sometimes I forget.

E.4 - placement of instructions. This system should display instructions near to where they are needed.

The color has not changed. In conjunction with, under discussion with CRT we added icons and languages 323g. When an icons is used to convey information, indicate an action or prompt a response it shall be accompanied by a corresponding linguistic label. In other words we have more than the icon itself conveying information. Any questions about these additions.

Lets go on to the next one. We added some adjustable font contrast recommendations. Lets turn to 3.24e available font size. 3.24j is high contrast for electronic displays. This says that a voting station should be capable of showing information at least two font sizes and also should allow for high contrast. Let me note that the accessibility section has these as mandatory requirements for the accessible voting station.

We note that a number of the systems that provide this for the accessible voting station also have it available on the non-accessible, I shouldn’t say non-accessible. The

voting section that's not designated as an accessible voting station. We put it in as a should here but I think we might want to consider making it a shall for all stations because often people with changing vision problems, for example, won't necessarily even think of themselves as needing these accessible voting station and there's many, many people, a large populations with that. So that little extra usability of all voting stations is very useful.

MR. SCHUTZER: I'd say shall is, in today's state of the art, this kind of thing changing even the type of font as well as the size and the contrast is fairly commonplace technology.

MR. WILLIAMS: I think, I agree these should be shells. I think you also need to address when in the voting session you can make this change because you don't want it to be all or nothing decision right at the front end because you may start out with the voting station in its normal configuration and find you can't read it and so you would like, in the middle of the session, you would like at any time during the sessions to be able to –

MS. LASKOWSKI: To adjust it. That's a very good point.

MS. QUESENBERY: I completely agree with that. I

would also say that we have been discussing whether you should be able to switch languages in the middle. We've seen people who are happy voting in English until they get to that long block of text. Then they want to read it in another language. I know that many of the systems do let you do that.

The other thing I would not is we do have to clear up an ambiguity that this does not necessarily apply to paper. We have all devices.

MR. SCHUTZER: You might want to say something about how you can change it. It can be, it can be daunting and more confusing to allow changing if its too complicated for someone to know how to do that.

DR. JEFFREY: Just to get clarification. Is there any objection to the should being changed to shall?

MS. LASKOWSKI: Certainly we will take it under discussion at the HFP subcommittee.

MR. WILLIAMS: Can we get a point of order here. We are not making changes here are we? We're making recommendations.

MS. LASKOWSKI: You are just making recommendations for us to consider back in subcommittee.

MS. QUESENBERY: What we wanted was a sense of this

committee on whether there were objections that we hadn't considered.

MR. SCHUTZER: There's no need for resolutions here, right?

MS. LASKOWSKI: Absolutely not. We just didn't want to blind side anyone when we actually have the standard that we are voting on when we have this opportunity now to discuss what other considerations that we may have missed.

So, 3.24 - perceptual issues. We added under discussion with the VVPAT team visual access to VVPAT 3.2.4 and a question out there is does this need further clarification or is it clear enough?

When the voting system asks a voter to compare two distinct records of his or her vote as in VVPAT systems both records shall be position so as to be easily viewable and legible from the same posture. In other words, you don't want to have to be moving back and forth from the voting station.

MR. WILLIAMS: I agree with that. Also when you are comparing two records of your vote to get back to the previous issue, should these be in the same font sizes and the same contrast and the same language?

MS. QUESENBERY: I think that's an interesting point that we deferred to wait to hear what happened with the SI and I was pleased that the resolution we've just approved includes consideration of that. I think it will come up under that.

When we were dealing with the possibility of some of the thermal printers that don't have that capability very well, we were sort of wondering what to do but now we have a little bit more open field to think about this.

MR. WILLIAMS: Exactly. If the intent here is for me to verify my vote so to speak, I can very well verify it if I can't read it.

MS. LASKOWSKI: We stuttered with that. In fact I can't read –

MR. SCHUTZER: I think it's a nice objective to be able to have them in the same position and everything else but its not necessarily clear that – its good to have two records to compare even they are not in the same position. Its possible that someone has the CRT like this, you are not going to want the printer necessarily, maybe it can and maybe it can't be in that kind of –

MS. LASKOWSKI: I think we want to avoid a situation

where you have to move over behind the machine or –

MR. WILLIAMS: Why not say that you can review them by moving only your head.

MS. LASKOWSKI: From the same posture. So, posture implies standing so you should be able to just glance over.

PAUL MILLER: One thing I think may need to be considered here is that the DRE systems often don't display the complete ballot. There is simply not enough room on the review screen to display everything at the same time. So you may, on you review screen, you may be actually flipping through four or five screen.

MS. LASKOWSKI: This refers to VVPAT or some paper as opposed to the review screen on the DRE.

PAUL MILLER: Yes but we were talking about the side by side comparison and so the question I'm asking is what is viewable over here, while you are only viewing part of your total review choices over here.

MS. LASKOWSKI: This, I think, was a bigger problem with paper rolls.

PAUL MILLER: Well, I'm actually more concerned –

MR. SCHUTZER: That was my point.

MS. LASKOWSKI: We've discussed this issue. We have

never really come up with a good –

MS. QUESENBERY: I think there is a lot of open things to discuss that are probably next on our plate. What we wanted to avoid was someone having to sit down or stand up, move significantly left or right, not be able to see them in the same field division just by moving their head. So, Brit's comment, yeah.

MS. LASKOWSKI: Your feedback helps us prioritize what we look at. That definitely is an issue.

PAUL MILLER: I know we had the discussion about paper rolls yesterday but I was just asking another member of the panel when we made the decision to get rid of the paper rolls. I'm not aware that we have made that decision yet.

MS. QUESENBERY: We have not and that part of why this is hanging fire.

MS. LASKOWSKI: We were rewriting the resolution. That's right. Sorry, I miss spoke.

MS. QUESENBERY: Part of our concern was waiting to see what context we were dealing with.

MR. WILLIAMS: We just said we were not going to (too far from mike to be understood).

DR. JEFFREY: John, did you want to say something?

MR. WACK: Well, this would also apply to, you know, any VVPR type system. It could apply to VVPAT if you know, a cut sheet flat. The intent, at least from the STS side was, if you are going to go through the trouble of having a VVPAT system, you have to come up with some way of facilitating the voter to actually do the comparison. We didn't know if this was the best requirement but, you know I kind of leave it to HFP to decide how best to specify that. That is the overall aim.

MS. QUESENBERY: Perhaps the sense of the meeting I've just heard and the feedback to us is that we need to go a little broader and think about what the real goal is before we dive down into a detailed requirement like this. I see nods so.

MS. LASKOWSKI: We reworked timing issues and added requirements on how long a system voter waits for each other to interact. So let me go over a few definitions first before I go over the requirements themselves.

By initial response time we mean the time taken from when the voter performs some detectible action such as pressing a button to when the voter begins to respond in some obvious way, like an audible response or it starts a

change on the screen. So, just the initial response time of the voting system to the voter.

A completed response time, again this is the voting system response time is a time taken from when the voter performs some detectible action to when the voting system completes its response, like finishes displaying the next page of a screen.

Inactivity time is the amount of time the equipment will wait for a detectible voter activity before issuing an alert to the voter. So, if the voter is sort of thinking for awhile, reading a long referendum, that would be inactivity time.

Alert time is the amount of time the equipment will wait for detectible voter activity after issuing an alert and then going into an inactive state requiring a poll worker intervention.

So, in other words the voter is kind of pausing to read a referendum, an alert comes up, the voter acts at that point, the timing starts over again. If it's a voter who left, then there is a certain amount of time and then the, with no response to the alert, after which the equipment goes into an inactive state to wait for a poll worker.

MR. WILLIAMS: On these where you give a range of time does that imply that the system has the ability to set the time between those limits or are you going to pick a time between those limits and put that in the standard?

My recommendation, since I brought this up, is that you simply pick a time like 5 minutes –

MS. LASKOWSKI: Okay, so when we get, when we get to that –

MR. WILLIAMS: because otherwise you are building complexity into the system when you don't really need complexity.

MS. QUESENBERY: We'd be happy to.

MS. LASKOWSKI: So when I get to that point, I'll note it as I go through these.

So the initial response time of voting systems shall be no greater than half a second. The maximum completed response time is when the voter performs an action to record a single vote the completed response time of the voting system shall be no greater than one second in the case of a visual response and no greater than five seconds in the case of an audio response.

Also this is something new. We have made a distinction

between a visual response time and the audio ballot response time. The maximum completed visual response time of the voting system for any voter action shall be requiring a response by the voting system shall be no greater than ten seconds.

MS. QUESENBERY: Sharon, you will not that there is no completed time for an audio system because that would depend on the length, for instance, of what has to be read and therefore can –

MS. LASKOWSKI: I'm at 3.251d. If a system has not completed the visual response within one second it shall present to the voter within half a second of the voter action, some indication that's preparing its response.

MR. SCHUTZER: There are things, I want to say you have in your definitions of 3.251 inactivity time. Here you have two different types of activities indicated.

MS. LASKOWSKI: Inactivity is voter inactivity time, when the voter is not –

MR. SCHUTZER: (Talking over each other) so you might want to have the definitions to match.

MS. LASKOWSKI:System activity versus voter inactivity, I'm not sure of your comment.

MR. SCHUTZER: Your inactivity time is the voter inactivity time. You also talk about a system activity.

MS. QUESENBERY: This stuff is a tongue twister. This is probably the most technical tongue twister of the stuff we've got.

MS. LASKOWSKI: I see your point. We'll look at that. I see what you are saying.

So, system activity indicators, an hour glass, something like that. Voter inactivity time, the voting system shall detect and warn about lengthy voter inactivity during a session. Each system shall have a defined and documented inactivity time. That time shall be between two and five minutes.

We do have this question, is a two to five minute range appropriate? You are saying let's pick one.

MR. WILLIAMS: Yeah, in picking one keep in mind that you are going to have resolutions on their that are going to take time to read. So, I'd tend to go conservative on that. You don't want to rush voters, so to speak. The object of voting is not to vote fast.

MS. LASKOWSKI: We've seen a wide range on current voting machines.

MR. SCHUTZER: It could be very irritating if you –

MS. LASKOWSKI: Every thirty seconds –

MR. WILLIAMS: I would go with the five minutes on that.

MS. QUESENBERY: The other point that's sort of buried in here is that it should be consistent, so that its not long in some cases, short in others but that a voter can, to the extent that you have a very short voting session, get used to the rhythm of the machine and how its going to respond to you.

MR. WILLIAMS: If a voter stays at a voting station for an inordinate time, and inordinate is a subjective terms. If a poll worker thinks its inordinate, its inordinate.

MS. LASKOWSKI: When the line is long and the poll worker is watching.

MR. WILLIAMS: If that happens the poll worker is going to go over and ask them, you know, do you need assistance? Is everything okay here.

MR. WAGNER: This is a minor point so feel free to tell me we should take this off line. I just wanted to support the drafting that you've currently got. It may be okay. The concern that I heard you raise, Brit, if I understand correctly, is that this might create complexity for voting

systems if the voting vendor has to allow election officials to specify the inactivity time because that's one more configuration option. I agree that could add the burden on vendors.

As I understand the system, though the system provides --

MR. WILLIAMS: I was concerned about the election official setting up the election. I don't care how much –

MS. QUESENBERY: I think our assumption was that that time would be selected by the vendor and would be hard coded not – am I right, John?

I'm fine with it either way but we did not ever consider this to be a configuration option. So whether we pick one or allow the vendors to pick one –

MR. WAGNER: Let me restate that. I think that it might be fine to have a range in the standard that allows the vendor to pick one rather than the standard saying it must be exactly three minutes because either way, neither would introduce a burden on election officials. I think they would both address that concern.

MR. SCHUTZER: I think what we're saying is that when

the system is responding to the voter there you want to place some time constraints because it could be very irritating if it takes too long to respond to a person. It would not be considered user friendly.

Frankly if we could do it instantaneously, so much the better but you are just talking what is the current state of the art. If it's the machine waiting for the user in this particular case, since there is such great variability, its in my mind, probably a little less important.

MS. QUESENBERY: I think I agree. What I would like to do is take this back and get the staff to review the research because one of the things we have done is consult with ITA to make sure that we are being reasonable. I would like to make sure that we are picking a conservative number that's an appropriate conservative number.

MR. WILLIAMS: Since I'm recommending things that other people are going to, you might also consider on this system activity thing, not just the voter but whoever happens to using the system. We've had a case where, when we are doing consolidation after the polls close, it took a long time and the system didn't give any indication that it was working and people would shut it down thinking that it had

stopped working or something.

So, I'd say (talking over each other).

MS. LASKOWSKI: We've had some discussions that aren't in this draft about --

MS. QUESENBERY: Yeah, that's great input because we have been struggling to figure out what we can do to expand this into all the operations with the equipment and not just voting.

MS. LASKOWSKI: And in fact for a very long process that a poll worker might see at the end of the day some indication of how much further to go, percent done. Its also a very useful thing. At least the hour glass or, yeah, something

I think we are through with that.

DR. JEFFREY: I need to remind people because of the webcast to please use the microphone so it will be picked up on the webcast.

MS. LASKOWSKI: Let me find out how much time and when is the break, so I can –

DR. JEFFREY: The break is current scheduled at 10:15.

MS. LASKOWSKI: Well, actually, depending on the discussion, I might be done at 10:15. Let me see how far I get at 10:15 and then maybe we might need a little wrap

afterwards.

Alternative languages. This one was, we clarified this requirement. My slide I think summarizes, I have more pros in the draft itself.

In VVSG 05, the EAC version that was released says that the voting equipment shall be capable of present the ballot, ballot selection or view screens and instructions in any language required by State or Federal law. We felt that when you read this it was confusing because we think it confuses deployment with the requirement for certification.

Each state has a certain set of requirements, language requirements depending on the demographics of their state. When a machine goes in for certification, does this mean it should be certified for all languages or its certified to a list of declared languages that the vendor supplies?

MR. WILLIAMS: The latter. The latter. The vendor declares what languages he is going to support and its tested for those languages.

MS. QUESENBERY: This is simply clarifying the language to say that.

MR. WILLIAMS: Because as a vendor, I may decide that

I'm only going to support Spanish and I am only going to work in areas that require English and Spanish

MS. LASKOWSKI: And indeed our draft requirement 3.26-a says exactly that.

MR. SCHUTZER: You know, I'm not a linguist, but some of the earlier guide that you gave on how to write plain language might not carry over into some of these other languages. There might be other rules.

MS. QUESENBERY: Plain language is plain language in any language. Furthermore, you are translating English so if you don't start from a base clearly understood English, it doesn't get any better when you translate it.

MR. WAGNER: Some languages write in columns, not lines, starting a new instruction on each line.

MR. SCHUTZER: Right, some have adjectives in the other direction and some languages they are used to speaking in a different kind of tense. I believe its not as simple as that.

MR. WILLIAMS: In addition some languages are verbally based and others are noun based.

MS. QUESENBERY: Why don't we take this off line. I think this is way more discussion than –

MS. LASKOWSKI: Yeah and the – yeah. It's a good research topic.

In the VVSG there was a discussion paragraph that alluded to the voter not receiving take away proof about how he or she voted.

MR. SCHUTZER: I understand the intent of that but, you know, in the interest of what we were talking about in the innovation aspect of how you might do voter verification, some time in the future, its conceivable that I might, because the voter might walk away with a receipt, that would be able to prove to the voter but to no one else how they voted. You would give some kind of transaction number that would be blind to how they voted.

MS. QUESENBERY: So its actually direct proof available to anyone about how they voted.

MR. SCHUTZER: Yes, yes.

MS. LASKOWSKI: So we probably need to add a little qualification.

JOHN WACK: We'll check with STS on that. There is a number of interesting variations of that notion.

MS. QUESENBERY: Let's make sure we do work with STS because we don't want to preclude some of the other

solutions that are being proposed.

MS. LASKOWSKI: Section 3.2.8 is a new section that's usability for poll workers. We also adapted some requirements after discussion with CRT from maintenance and safety that occurred elsewhere. I will first note that these are still somewhat subjective.

We wanted to put a stake in the ground for these but we don't have specific requirements at this point. I will talk a little bit more about that later on in some of the issues at the end of the talk.

MALE SPEAKER 3: Sharon, if I could bring up one topic that may fit into this and that is, a single selection, it would be state specific and configure the system according to the requirements of that state. I don't think that's there and I've heard that requested a number of times.

MS. LASKOWSKI: Okay, I'm not sure I understand the context of –

MALES SPEAKER 3: Are you talking about the set up and configuration of the equipment.

MS. LASKOWSKI: Yes.

MALE SPEAKER 3: The issue that's come up a number of times and Brit I'm sure you've heard it more than I have,

or Paul, that sometimes local officials don't know exactly how to configure the system to reflect full state requirements on a number of points. It would be very helpful for an example, if you know you are in Pennsylvania, you say configure for Pennsylvania law and that automatically selects the number of configure selections.

MS. LASKOWSKI: We haven't really addressed configuration management. When we talk about set up, shut down, we are talking about very basic operations but certainly configuration management is yet another operation and we would have to consider that in committee.

MALE SPEAKER 3: I've heard of a number of cases where someone locally won't realize it by selecting something in the configuration. They are actually setting the machine up contrary to their state law.

MS. LASKOWSKI: I guess I have to defer to some of our state people with state experience here because I'm not sure. Poll workers don's usually up the configuration. Aren't their technical people that set up the configuration?

Nevertheless it still should be somewhat error proof for those people as well.

MS. QUESENBERY: Yeah. We have been trying to

distinguish between voters, poll workers and back end election officials and we haven't really gotten much. I'm grateful to hear some suggestions.

MR. SCHUTZER: I just know this one has come up –

MS. LASKOWSKI: Yeah. We were really geared at the poll worker at the polling location.

MS. QUESENBERY: (Talking over each other) a collaboration with CRT because that sounds a lot like a core requirement to me.

MR. SCHUTZER: You might want to say something, I don't know, in usability, I'll defer to people that actually run these things, but although a lot of the set up and all that is sort of done outside, its quite possible that you might have problems during the conduct of the voting and anything that the system can do in order to make it easier for a poll worker to be able to get something back up and running would be helpful.

MS. LASKOWSKI: Some of that is covered in plain language but –

MS. QUESENBERY: That is the point of 3.281a, ease of normal operations. If normal operations include restarting a machine then that's part of normal operations.

MR. SCHUTZER: I didn't mean normal operations, I mean if something goes wrong.

Paper jams, system crashes, --

MS. QUESENBERY: I'm sorry, in my vocabulary, things (talking over each other) is part of normal operations.

If its normal for the system to break, then its normal to be able to fix it.

MS. LASKOWSKI: So ease of normal operation. This is a big subjective. A procedure shall be reasonably easy for the average poll worker to learn, understand and perform. What does that mean? We have to think a little bit about how would that be tested. At the very least one could do an expert review at certification time just to see if reading the instructions and following the set up could be done without an error by someone who is an expert in certifying the systems.

At the very least we also think more can be done with making sure the documentation, etc. is more usable. It's a work in progress.

MR. WILLIAMS: Keep in mind on things like this, that there are two stages to the certification. There is the

lab testing itself and then there's the subsequent review by the EAC reviewers. So everything doesn't have to take place in the laboratory testing. Some of the things you are talking about here could be directed toward the EAC review.

MS. LASKOWSKI: So, some sort of committee might be assigned to look at – let's just run through it and see whether it passes muster.

We also added…

(END OF AUDIOTAPE 6)

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(START OF AUDIOTAPE 7)

…they should submit a report on the usability testing they did in house.

Maintenance was more or less taken from another section under discussion with CRT.

Let me go to the next slide. That's 3.282a. The following physical attributes shall be sufficient available so as to support good maintainability, presence of labels and identification of test points., provision of built in test and diagnostic circuitry, etc. This was in another part of the standard. Right, David?

MR. FLATER: Carried over.

MS. LASKOWSKI: Carried over from the VSF 02. We moved them here because it looked like they were technician usability requirements.

MR. WILLIAMS: This crosses over a little bit into your security features when you are talking about, because part of maintenance is verifying that the thing is what its supposed to be. So you also need a facility here to validate that the software is the correct version that its supposed to be.

MS. QUESENBERY: Yes, but probably not in this section.

MS. LASKOWSKI: We were looking at it through the physical maintenance of the machine but there is certainly other things that need to be checked and they should be able to be done fairly easily.

MS. QUESENBERY: I’m afraid this is one of those either place you put it isn’t quite right problems. Which things do you keep together in structuring the document?

MALE SPEAKER 4: I have a question about documentation which is something we are going to be facing all over the place.

In terms of criteria for when a document fails. If you say clear and complete documentation for all maintenance conditions, do we have more guidance for the testing labs on when a document –

MS. LASKOWSKI: I'll take a little bit about that a little bit later in the talk. If I don't address your question, please ask again?

MALE SPEAKER 5: I haven't thought about this at all, so this is an off the cuff reaction.

It seems like there may be a policy, an interesting policy question here with the maintenance that there may be many different kinds of maintenance or repair that might be required and you could envision different models, one model being that the jurisdiction should be able to perform all of that on their own if they decide to. Another model may be that maybe they require vendor support.

I'm wondering is this taking a position on that? All maintenance conditions is a very broad statement.

MS. QUESENBERY: This is in a section of usability for poll workers. I mean maybe we should make it more explicit but the implicit statement is that this is things that you expect the poll worker to do.

MR. WILLIAMS: You specifically don't want to include outside or vendor maintenance in this because any time a machine goes outside of your control when it comes back you have got to put it back through acceptance testing and the whole nine yards. So, this is internal user stuff here.

MS. LASKOWSKI: We did a similar thing for some of the safety requirements that had been carried over, compliance with Federal regulations, equipment design for personnel safety shall be equal to or better than the appropriate requirement of OSHA, Title 19, part 1910, elimination of hazards, all voting systems and their components to be designed to eliminate hazards to personnel or to the equipment itself.

Its basically if you are looking at it, there's something, we wanted an, for the certification, at the lab level that's something that's just dangerous to say, wait, violation of safety.

We removed a VVSG 05 requirement because we didn't think it was testable. Defects in design and construction that can result in personal injury or equipment damage must be detected and corrected before voting systems and components are placed into service. We felt we couldn't predict that

necessarily and we didn't know how to write a test to do that.

MR. BERGER: We have very well established safety standards typically certified by UL or similar agencies. I would really worry if we try and duplicate that effort in that we may get it wrong. We've got good standards, I think we ought to just cite them.

MS. QUESENBERY: I would note that this is carryover text. This is in the VVSG 05.

MR. BERGER: That's probably not a good reason to carry it over. Let's just cite the reference. I think its IAC 901. Anyway someone can cite that.

MS. LASKOWSKI: I guess we need some guidance into which standards, safety standards are appropriate.

MS. QUESENBERY: What we do, I mean the first one we do.

PROFESSOR RIVEST: With respect to hazards and standards one of the things that came up in the last election I was observing in talking to poll workers was the weight of the equipment and some poll workers were concerned that the equipment was a bit to heavy for them to set up easily. Do we have standards, how are those, there are ultimate

OSHA standards or something, how big do you want people to lift things.

MS. LASKOWSKI: That might fall under usability of set up for poll workers.

MS. QUESENBERY: I generally agree that citing existing OSHA standards or whatever is the right answer and not getting into a lot of detail.

MR. BERGER: For product safety there is an IAC standard that is internationally recognized. We can get that number easily. You are right, the set up that would be a workplace standard and that's different.

MS. LASKOWSKI: Okay, so its IEC – e-mail it to me, okay.

On to the accessibility section. These refer to those voting stations that are designated as the accessible voting stations.

The first one is 3.22 partial vision. We updated and clarified older requirements on contrasting color.

Specifically for contrast, lets see. Contrast was the only visual aspect for which the voter was not guaranteed control. So we didn't think there was a reason to permit poll worker intervention only in this case.

MS. QUESENBERY: Sharon, so the change in here is

not in the technical requirement of how much contrast but in removing the with the assistance of a poll worker.

MS. LASKOWSKI: Right.

MS. QUESENBERY: John, is that correct?

MS. LASKOWSKI: Yes, sure.

MR. BERGER: Sharon a question. On those kinds of requirements do you also include a requirement to return the system to default for every vote?

MS. QUESENBERY: Yes.

MS. LASKOWSKI: Somewhere else in the standard we do have that, yes.

MR. BERGER: Okay.

MS. LASKOWSKI: Let’s see we clarified the, oh, for distinctive button and control we added that this applies to both on screen buttons and hardware. That was the change there. So, a physical button or an on screen button need to be distinguishable by both shape and color.

For synchronized eye and visual we added that there shall be a means by which the voter can disable either the audio or video output resulting in a video only or audio only presentation, respectively.

The 333c, control of speed under the blindness section.

We upgraded this requirement to a shall. It was a should before. The audio shall allow voters to control the rate of speech.

MR. SCHUTZER: Do you want to say something about the audio needed to be —

DR. JEFFREY: Could you repeat the question in the microphone?

MR. SCHUTZER: Do you want to say something that the audio has to some kind of headphones or something like that rather than just blasting out of the booth.

MS. QUESENBERY: That's all in separate sections. We are only reviewing the changes.

MS. LASKOWSKI: That was just upgraded. There was a suggestion, this is 335 mobility. There was a suggestion to the EAC during the VVSG 05 comment period that we, by the way, had gone through all the suggestions and comments, when we went through the clarifying revise, so this resulted in the following additional requirement.

When deployed according to the installation instructions provided by the vendor, the voting station shall allow adequate room for an assistant to the voter.

MR. WILLIAMS: You want to look at your wording there.

I don't know if you want adequate room or adequate access. You could have lots of room around it and not be easy to get to.

MS. LASKOWSKI: Okay.

MR. WILLIAMS: So, look at the wording.

MS. LASKOWSKI: Yeah, that's a good suggestion.

So, we can either take a break now or –

DR. JEFFREY: I was just going to ask you if this was a good time for you.

So I would suggest a break and everyone please be back ready to go at 10:30. Thank you.

BREAK

DR. JEFFREY: We will be beginning again in about one minute.

Okay. We are now going to get started again. So, Sharon back to you.

MS. LASKOWSKI: So, I'm done talking about the draft and the changes that we've made and, so, I want to talk first on the research progress and then the rest of my talk is about areas of future analysis and research that we have identified.

Early on you heard about, saw the place holders for

our usability performance benchmarks and we have been doing some research to develop our test protocol. I just got the results so I'm not, I don't have any vetted data that I can put out now because we are still trying to see what it all means exactly in terms of the benchmarks. Our preliminary results appear to confirm our hypothesis that indeed we can define benchmarks with usability testing by our protocol and getting some reasonable, usable sets of test voters we can measure the usability performance against those benchmarks and we can discriminate against different implementations. That was kind of a key thing we were looking for to make sure this whole approach to usability benchmarks as a conformance test is going to work. We are optimistic that as we collect more data and do our analysis that we will be able to develop these benchmarks.

The protocol successfully measured time to vote and so we were able to measure error rates. We also measured time to vote satisfaction, but on those two dimensions there we didn't see significant differences between the two systems we tested.

Again, we were just kind of seeing if our test protocol would get us measurable results which it did, so I can't

really say anything more beyond that.

Our next steps are some additional experiments to get those benchmarks and validate our test protocol and validate that we are using the right test voter populations for these conformance tests to get reproducability. Are there any questions about that part of the research?

Our goal is to get something in this new version of the standards this spring.

The second area of research that we started is looking at plain language research geared at specifically voting language and instructions on the ballot itself. As I said, our requirements so far which is derived from looking at the best practice in other domains and so we have got the experiments defined and we are about to start running some experiments to see if we can get some additional plain language guidance in there. Any questions?

As we've journeyed through developing these standards we have come up against a number of issues that we would like to say something about in the standard but we need to do further analysis. I've listed the major ones here but if you've got any other suggestions I would love to hear about them and try to figure out how to work those into the

analysis that we are going to be doing in the next seven months.

As you noticed I've talked a little bit about some of the color saturation, color coding, touched a little on it today. Those requirements are pretty general and we know that there is a number of experts out there on use of color and accessibility of color and we thought it would certainly be worthwhile finding a leading expert in this area to provide some color guidance for the vendors because typically someone sits down they are going to design the interface and they are looking at the color and if they are not an expert, its easy to get it wrong. Best practice is pretty well know so we thought that would be a good white paper to do.

MR. BERGER: Sharon, a couple of comments. On the color you may want to investigate a very simple option of eliminating it. I believe all of your color problems go away with a high contrast black and white.

MS. QUESENBERY: If I could address that. Its something that happens. People say oh color is hard, lets not do it. Color helps lots of people with perception and I see no reason to outlaw a useful design tool because it takes some work to get it right.

MR. BERGER: I'm sorry you are misunderstanding me Whitney. I was saying as an option allow high contrast black and white.

MS. QUESENBERY: We do.

MR. BERGER: Then I think that takes care of all your color blindness issues.

MS. QUESENBERY: It does and it doesn't. I mean, the problem that I see with saying well, they could always throw it into high contrast or into black and white is that not everybody self identifies, not everybody thinks of making an adjustment and they may not realize that they are seeing the screen inaccurately. So, what you want to do is make sure that the, to the extent that you can, that you have worked to making the screen good contrast, that you are not doing light gray on dark gray, that you are not doing red on black or things that we know are bad. It's a little hard to quantify those into a testable requirement.

MR. BERGER: I'll leave it with you all. You're the experts but I do remember a comment from Ted Sulker that, if you leave it to the user to adjust, most users will have a hard time finding the right combination. If you give them a set of options, the tend to find the one that works well

for them.

MS. QUESENBERY: That's certainly not original of Ted Sulker and we are not talking about users adjusting the colors. We are talking about the color capability of the system.

MS. LASKOWSKI: The default design in the use of color.

MS. QUESENBERY: Indeed color sets are an excellent way to solve that and there have been some proposals that since it is possible to mathematically calculate contrast ratio between our GVUs that you could use that to bound the machines. That's sort of way beyond, I think, what we want to put in these requirements but its certainly an idea that I've heard various vendors discussing and how can they create pieces of their configuration software that would help people do a better job. I applaud all of those.

MS. LASKOWSKI: The second issue is audio interface guidance. We've seen vote by phone and certainly the audio voter (undecipherable) ballot devices. We think that the standards for these could benefit from looking at research findings out of the interactive voice response community.

There is a lot of research out there about how long to pause, when to pause, tone of voice that makes things

easier for the voter. I'm not proposing that we do research, but just that we collect the best known practice and see if those can be worked into some standards.

As you know, we've required both vendors to report on usability testing and our test protocol on usability testing for conformance that the lab should be doing also a form of what we call summative (sic) tests that report on the errors time satisfaction and a standard that was developed at NIST for (undecipherable) is basically a test report format for such tests. Its very general for any use. We think it would be a very good idea to sit down and customize it for voting systems so that we get uniform reports so that we get some comparability so that if states want to do some of their own usability testing, even on their proposed ballot design, for example, that other human factors professionals that might be hired to performed these usability tests have some guidance on how to do these tests appropriately.

There has arisen a couple of times in our discussions thus far, the usability of the documentation that the poll workers see and other technical people see. In discussion with CRT there were a number of sections of requirements that also required sort of documentation shall be provided

and usability documentation should be provided kind of scattered all over the place. We thought it would be a good idea to try to consolidate that and try to think of some way to get at what do we mean by usable documentation?

That would include system documentation, set up operations, users manuals, etc. that the vendor provides with their equipment as opposed to a lot of the documentation on the training manuals that states develop for their particular situation. This is the stuff that comes with the equipment. We think that's practice for technical documentation, of which there is a lot, should be applied to these.

An idea we had is to develop a style guide based on best practice for this documentation to follow as a way to try to get at this. Its very (undecipherable) we are going to try to do usability testing for all the procedures and how they are described in the documentation, a lot of documentation. We thought at least some guidance on how to do this well.

MS. QUESENBERY: Something that I learned recently is that there is actually an ISO committee moving forward with some standards for technical documentation. Maybe we

can piggyback on some of that work.

MS. LASKOWSKI: Of course, ISO usually takes a long time but at least we can find out who the experts are.

MS. QUESENBERY: Yeah, but those early committee reports might be useful.

MS. LASKOWSKI: One area that we haven't addressed, I talked about usability testing for the general voting station and our benchmarks there but having design guidance in an accessibility standard for the accessible voting station is not necessarily sufficient to ensure good usability of those accessible voting stations. It does not necessarily guarantee that the people using these alternative accessible methods can vote in a timely fashion with few errors. We think its really important to look at how to do usability testing for the accessible voting station.

In addition to that the benchmarks are going to be different. The benchmarks are going to be different for audio. Its going to take longer because you have to listen. Visual is quicker.

We think work is needed to adapt the sift (sic) test reporting. How do you run a good usability test to measure the usability of the accessible voting station? We also

would like to generate some test benchmarks and procedures. We, at least want to take a stab at that, seven months is not a lot of time to get benchmarks, but we will try to get started since we do think it's a critical area to look at.

As we talked yesterday and today, there is going to be a lot security requirements further developed and we think its critical to look at the usability and assess the impact of this say for software independence, paper based approaches. We really want to take a holistic approach. We find close (undecipherable) between STS and CRT because I think, and we've talked about maybe doing some joint tele-cons and the like across committees to help with that and making sure we make a point of talking more amongst each others at NIST because we think that this will help identify and articulate the key issues.

Whitney has written a short white paper on looking at end-to-end accessibility for the voter process thinking about how we can develop a requirement to show that, if we can't show the entire system is accessible, that's the highest standard to show how reasonable accommodation fills in gaps for full accessibility. As we look at some of these newer approaches with respect to VVPR, for example, that

kind of approach can help identify gaps and also solutions. That white paper is included in your handouts.

MS. QUESENBERY: My biggest concern is that not only are we beginning to worry about the usability of accessible technology, but that when we look at a pile of equipment, that somehow we think about how we incorporate something into the standard that says how does this all fit together to make a fully accessible voting experience.

If some voters are completing a task one way, how are people with a different disability going to complete that task in an accessible way? So we can sort of begin to look at a system that's entirely, I've been warned by Ron that I'm using end-to-end incorrectly. I think I'm using it the way David uses and not the way Ron used it.

MR. BERGER: I would say correctly is a term, it a new term which we are going to use in the security committee to mean certain things.

MS. QUESENBERY: Maybe the CRT testing and us should get together and think what else we are going to call it.

MS. LASKOWSKI: We just started talking about this, so we'll improve our vocabulary.

MR. SCHUTZER: I have a suggestion now that we are going

to (undecipherable) as I said we've got this schedule and time table going toward us but some of the issues are sort of like behind us, its just a lot of work to get all those things done. We have been trying to coordinate amongst each other. To be honest, because of the time pressures what that means is I get about three calls if I really wanted to coordinate that I'd have to do a month which is pretty hard.

A suggestion is that for those key items that we really think we want to coordinate as we come down to the crunch, of course the three of us, we might schedule just some separate call just for that at a time we can all mutually make. There may be some like that. I'm thinking in terms of a resolution Steve's going to have. We want to really look at the lessons learned from this last election and really look hard at the specifications that we are generating now and that exist in terms of seeing what we could do just to solve any problems that cropped up at the last election.

MS. QUESENBERY: I completely agree. We've actually benefitted on HFP from actually declaring in advance the topic we are going to talk about so people can read a small amount of material and not be prepared to talk about

everything all at once. When we get to certain things, we just simply have a joint committee meeting, a joint dual committee meeting.

MS. LASKOWSKI: Does that answer your question about documentation?

MALE SPEAKER 6: Well, the whole process by which documentation gets reviewed, I mean, its really an HFP solution for usability of the documentation. I guess completeness is the other thing. If somebody doesn't give a description of how to handle a printer jam or something like that then I guess you have to go through the process of failing it and having it rewritten. Maybe its all pretty straightforward.

MS. QUESENBERY: The other thing that came up was that completeness is sometimes a red herring. You can get really complete documentation that isn't actually usable because its not the right procedure for the right people and the right time. That's why we've started sort of saying, complete and clear and concise for whom under what conditions.

MALE SPEAKER 6: Yeah, it varies for the security committee, completeness, you really care about people

explaining why they've covered all the possible vulnerabilities.

MS. QUESENBERY: Exactly, if you are doing ATI documentation you actually want everything documented. If you are doing user documentation, you might want the functions they are using documented.

MS. LASKOWSKI: Well, that completes my talk. If anyone has issues they want to discuss or some suggestions for further white papers and analyses that we need to do.

MS. QUESENBERY: Can I just raise one because it comes up and I was reminded of it by a member of the audience in the hall. We have been talking about doing some research into the use of icons, just as we have been looking at what language makes things clearer, sort of expanding on this idea a little, but where, when and how do icons and images actually help improve the clarity of the voting process for voters? I'd like to get that onto the list, certainly starting with some desk research if not moving into something with performance research.

MR. SCHUTZER: Right. As long as you are looking into research issues, more interactive kinds of modes, not just for the icons, (undecipherable), more advanced things,

systems that can actually track and adapt to users. If you are doing research that's really what would be nice.

Instead of adjusting speeds and things like that, --

MS. QUESENBERY: Dan, not in the next seven months.

MR. SCHUTZER: Not for the specs. I thought you were designing a research program.

MS. QUESENBERY: Somewhere in 2008 maybe, when this is all over with but certainly not –

MS. LASKOWSKI: I've focused these on how we can impact the standard –

MR. SCHUTZER: Oh, okay.

MS. LASKOWSKI: -- and also in terms of measurement, you know, what can we measure kinds of things.

MS. QUESENBERY: Yes, there's a lot of Ph.D.'s out there that, if anybody is a student and looking for a good topic, there's some wonderful topics that we are trying to focus on, what we can get into the requirements.

MR. PEARCE: Phillip Pearce, U.S. Access Board. I'm sorry to go back to it, but I had one term that was used and its just been kind of gnawing at me since we went over it this morning.

Can you look back at your page 15 of your presentation.

There's one term there about ease of normal operation that says, easy for the average poll worker. My question is, is that a reasonable description because I've got to look at, if I'm by myself and the poll worker and I'm trying to do this thing and it says it should be easy for the average poll worker and I can't do it, does that make me an idiot? That's a concern. I'm sorry.

MS. LASKOWSKI: We'll think about that, that word average but I would point out as far as the voting, we've seen similar mistakes across all demographics. I expect we are all average voters.

MS. QUESENBERY: Let me try this. When one of things – what we are trying to get at here was saying this is for poll workers not for your technical support people, not for your well, you know, people who have been through training by the vendor but people who have been through poll worker training and maybe average is a bad word. We were trying to get at poll worker –

MS. LASKOWSKI: Typical, yeah, maybe typical. We'll think about it.

MR. SCHUTZER: In the sense of like, we're all above average.

MS. LASKOWSKI: Of course.

DR. JEFFREY: In terms of dotting the i's and crossing the t's, I'm going to go back and actually correct one I missed before. It says that Human Factors and Privacy Subcommittee believe that they proceeding the course that they have just provided, actually correspond to a NIST case about nine different TGDC resolutions. Unless there is supplemental directions or corrections and taking into consideration the discussions that we have been having and been taking good notes on, they will continue to develop the products consistent with preliminary reports and the discussions that we've had this morning.

At this point are there any questions, further directions or corrections so that they can focus their efforts over the next seven months?

If not, is there a motion to adopt their report?

MALE SPEAKER 7: I'll so move.

DR. JEFFREY: Okay. Is there a second?

FEMALE SPEAKER 1: Second.

DR. JEFFREY: Is there unanimous consent on accepting their report?

Any objection to the unanimous consent? Okay, without

objection we will accept with unanimous consent given the discussion.

If I could now go back one step, Mark. I am going to ask Mark because there was one issue that came up where its ambiguous I think what the direction was.

MR. SKALL: Thank you. I want to go back to make sure that we at NIST understand the direction that was given to us so we can perform the research and the drafting exercises correctly.

David Flater discussed a key issue about whether the testing standard should require the test lab to perform activities that are beyond the scope, i.e., which don't relate to requirements in the VVSG. We, at NIST have had a lot of experience with this and we feel that one tests to conformance for the conformance requirements which are to meet the requirements in the standard. We worked on many, many committees and clearly testing, at least in our experience, always tests to ensure that the requirements are met. Nothing more, nothing less.

David stated that. There was no discussion on it. I want to make sure that he goes away with direction to proceed with that understanding if that in fact is what the committee

wants.

MR. SCHUTZER: Yeah, I would agree with the requirements but we had some discussion as to whether those requirements would include things such as concepts and availability.

MR. SKALL: The issue is just test for the requirements and requirements are a separate issue. Whatever requirement you are in the tests do that but nothing more.

MR. SCHUTZER: Right right.

MR. SKALL: Right now they –

MR. SCHUTZER: Right, I think the issue was in terms of what goes into the requirements that they test against as opposed to testing outside the requirements.

MR. BERGER: I actually have a resolution on that. Allan could you put that on the screen, please? That’s the one I gave you just a moment ago.

MS. QUESENBERY: While Allan is looking. I know one of the questions that came up a couple of meetings ago was whether a vendor might want to ask the test lab while they are doing the conformance testing, to do other testing. Nothing precludes that I assume?

MR. SKALL: Absolutely. Absolutely correct.

MR. BERGER: This is just a question of what requirements go into a testing standard.

DR. JEFFREY: While he's typing it in, why don't you describe the intent of the resolution?

MR. BERGER: It takes in two issues. The first is the one David brought up about should evaluation of the unit be confined to the failures that specifically happen during a test or could data and observations that happen at any time during the test campaign be brought into the evaluation. In my experience, its very important to allow the test personnel and specifically authorize them to bring in failures that happen outside of specifically the test regimen for a number of reasons, one of which is sometimes stresses create latent failures that don't show up until later. It takes some further investigation to figure out why those things happen.

The other thing is that some sort of operational conditions will happen at random times and until you construct the right test case, you won't reveal them. So, I think its important to authorize that testing be allowed outside for data that arises at any time during the test campaign.

MR. SCHUTZER: Or to put it another way, as you are examining what happened and the lessons learned. You may find there are additional things you might want to put into the requirements of the test which might include interactions between the voting equipment and the rest of the voting process it supports and so forth that may have caused problems.

MR. BERGER: Precisely.

MR. SCHUTZER: Things we neglected to put in the requirements –

MR. BERGER: Just one comment and – typically what we find in labs is you will see something two or three times and then the lead engineer will say, we need to look into that and see if there is a flaw here somehow. Very often that becomes extremely important investigation.

MS. QUESENBERY: Stephen, if I can just ask a question. I'm a little out of my depth with test campaigns. So I just want to put it in really simple language and see if that, if you still agree with that.

Are you saying that one way to do this would be to say the conformance test consists of running the following tests and that's it. If it doesn't happen within those tests,

it doesn't count. What you are saying is no, that during the course of testing, during the course of the entire campaign, data may come up in once place that affects a requirement in another place and they should be able to consider that?

MR. BERGER: Yes.

MS. QUESENBERY: Thank you.

MR. BERGER: The second part of the resolution says further guidelines shall require the systems be tested to verify that all functional -- I think there's a word missing -- that all functions operate per the vendor's documentation and are reasonably fit for use.

Basically, that's really what state certifying agencies believe is going on and I think its important that we actually fulfill that expectation.

DR. JEFFREY: Is that just for clarification? Does that imply that any additional functions that are included above and beyond the requirements have to be tested against.

MR. BERGER: For consistency and fitness for use, yes.

MALE SPEAKER 8: Can I make a couple of comments? The first part talks about TGC directs the data collected

throughout the testing campaign to be used in assessing a system for certification. It seems to me that what we do in developing our guideline is to produce requirements and produce conformance clause and talk about conformance to the requirements. Anything having to do with certification is the next step which is, to me, outside of the scope of what goes in a standards document.

The second point I would like to make is that, if we are to require that systems be tested to be reasonably fit for use, we in general write standards to be specific, unambiguous and precise. Fit for use is a term of art and my question would be how does one determine what fit for use is in a standards arena where in fact we are testing for precise and exact requirements.

MR. BERGER: Well, let me give you two examples. First of all this is exactly what ISO 9000 does. They come in. They look at the quality manual of a manufacturer and then evaluate whether in fact they are following their own documentation. So, that very parallel.

Secondly, in the European sphere there is a construct called The Technical Construction File wherein for new technologies or technologies that do not exactly fit a

standard, the intent of the standard is constructed and evaluated according to a regimen developed by the test engineers, placed in a construction file and that's the basis for regulatory certification.

MALE SPEAKER 8: Two points. Your first answer had to do with operating according to the vendor's documents. I have no problem with that. It's the second part reasonably fit for use and regulatory documents may. The regulatory documents are different types of documents which are not technical specifications. It seems to me we are crossing the line here and we are putting something in that can't be precisely defined and tested against.

MR. BERGER: This really goes to the expectation. I'll tell you the kinds of things that have happened and that concern me greatly.

In the early days of the VVPAT and there were no requirements on printers things were certified with printers on them and what that meant from the test agency was the document said there was a printer, I looked, there was a printer and its certified.

People who received and saw that was a certified system assumed a great deal else had been done about fitness for

use for that device. On a number of functions there's that expectation that this is a reasonable implementation to do whatever it claims to be doing.

We have the mechanism of the test plan wherein the requirements are specifically put into a test plan and then tested to and that's where you would get the specifics and obviously it could be reviewed further by EAC technical reviewers and so forth.

MR. SCHUTZER: Now I'm getting a little confused with exactly what you are asking for. Let me see if it can paraphrase it and tell me if I got it right. They have certain requirements. They test against those requirements and that's all they can do.

When you say testing period, you mean the equipment actually out in the field in use like in this last election that we are getting feedback from that might influence us into updating the requirements to reflect what we have learned? If those are updated, you could test for those but otherwise, I'm not sure. What do you mean by testing period?

MR. BERGER: This would be the time when the equipment is in the voting system test lab.

MS. QUESENBERY: I have a question that seems to come up a lot in other situations. How much does this expand the test and what kind of costs are we talking about here?

MR. BERGER: Well, I think that needs to be taken into context with everything else. We haven't brought that in on other issues. The kind of thing this is trying to look at is, things like, well any number of failure modes that may come up like the test personnel see periodic lock up of the system or crashes of the operating system, those sorts of things. They may or may not occur within the strict confines of a test but happen while the thing is in the lab, while they are using it, setting it up for testing and so forth.

MS. QUESENBERY: I don't think there's a lot of – certainly in my mind there is not a lot of controversy over that part of it. The part that I don't quite understand is when you say and you test all the functions. I share the concern that even good standards don't always guarantee good design. That's a tough one especially if there's new things that are added for which there are not yet standards.

I think (a) partly the innovation class should help

with that because if someone came in in the new world and said, well, we have this new idea its going to be a paper roll bolted onto the side of the machine. We would say well, in order to present that for certification we would have to come up with some way of evaluating it. I don't understand how you add a sort of open ended anything that this machine does gets tested.

MALE SPEAKER 9: Also for clarity I would like to come back to a point that Mark made. You've really got two different points on this resolution. The first point is on certification. If I'm not mistaken this certification that the wording is vested in the EAC and it is outside the scope of the TGDC. I don't think that would be relevant for us.

For the second one I was going to amplify it also seems like its an open ended testing and I'm not quite sure how we get closure on that.

MR. FLATER: If you read the text, verify that all functions operate per the vendor's documents, it sounds like its all good. Who could disagree with that. The issue is what happens on the ground when a test lab actually tries to do this. We are talking about functions for which there

is no standard. There is not a carefully written standard.

What we have is vendor's documentation which may be good, may be bad which is specifying what the system is supposed to do when you exercise the special feature. The thing is, lets suppose that what the system does, doesn't agree with the documentation. Well, this situation can be remedied by changing the documentation. There is no standard for this feature. Consequently, you can end up with a feature which isn't fit for use. I'm not at all certain about how this kind of direction, what this kind of direction is going to accomplish. It will, however assign additional duties to the test lab above and beyond the conformity assessment that they have been accredited to do.

MR. SCHUTZER: I would tend to agree with that. The vendor may indeed provide functions in their documentation that are optional, nice to have and not necessarily specified in the minimum guidelines. I don't know if you want to get into that in terms of testing those functions that are not in the guidelines. Something over a period of time we may look at and we may find those additional functions good things to have and to include in the guidelines and we may find

through experience over time, there may be additional kinds of functions we would want, but I think to keep the test finite, its got to be keyed to what's in the guidelines we agree upon and the functions we agree upon. Those functions can change over time and I would certainly support something where we take a look at the lessons learned in this last election and just re-examine if we've left things out that we should put in to the guidelines and therefore testing.

MALE SPEAKER 10: Does that describe, well exactly how you test the equipment for adequate audio equalizer given that we don't have any standard for that.

MR. BERGER: A couple of things. One is I think we are going to need –

DR. JEFFREY: I actually – Brit first.

MR. WILLIAMS: The previous versions of the standards have contained the requirement that the system has to conform to its own documentation. Is that requirement going to be in this next version?

MALE SPEAKER 11: Well, that's the issue right in front of us.

MR. WILLIAMS: Well, personally I think it should because when it comes out of certification, and I read the

documentation, I want the conformancy statement to imply that it conforms to that documentation.

I'll give you a specific example. The State of Pennsylvania has a very peculiar way of handling certain types of straight party cross over vote. No other state has that particular feature. In fact it called the Pennsylvania Method. If the documentation says that this system will satisfy the Pennsylvania Method and it comes through certification, I want the ITA's to have tested for that and the reviewers to verify that that is in fact the case and it will perform that Pennsylvania Method. I want it to conform to its own documentation.

MR. BERGER: A couple of things. One is, I think, it would certainly be recommended to the committee to be self-consistent and if we don't allow open testing for functions, should it be allowed for security or usability?

MR. WILLIAMS: To follow up on your comment David. You are right. If in testing it turns out that that system will not perform the Pennsylvania Method, then one of the vendor's options is to delete that from the documentation.

The other is to go fix it.

MS. QUESENBERY: I have to say that as I listen to it, a requirement that says the system will conform to its own documentation is a lot more palatable than the text that's up there which seems to me more open ended that all functions operate and are fit for use just seems much broader to me than the documentation is complete and accurate.

MR. SCHUTZER: If you took the second paragraph only, took out the reasonably fit for use, you basically have what was said, what I just heard.

MALE SPEAKER 12: The issue is a general requirement saying that the system shall agree with its documentation is all find and good. The issue is how we are going to scope the conformity assessment for that requirement.

Once you go beyond the functions that are specified in the product standard, you are talking about open ended testing. We must test every single function of the system, including vendor specific functions for which there is no standard for what they do. This means, on the one hand, we might end up testing and gaining some confidence that the Pennsylvania straight party voting method has been properly implemented.

On the other hand, there are cases other than the

alternative that you cited in which they simply delete that from the documentation.

There is also the case where it performs not according to Pennsylvania law but neither do we delete the feature, we simply change the documentation to note that. Actually one time in a thousand when you invoke this feature it might accidentally erase the ballot.

MR. WILLIAMS: You are way out in left field on that.

MALE SPEAKER 13: Let me try to summarize. I think some, at least one of the statements I made is that fit for use is not a specific term. We spend a lot of time, we all do, writing precise testable requirements. That's one of the things that takes up a lot of our time. When you read a vendor's documentation, they may or may not spend a lot of time being precise in what's supposed to happen.

So, when we are saying we want to verify that functions operate correctly, we are not testing against precise necessarily precise and specific requirements. There are many ways to interpret vendor's documentation. So we get back into that same vagueness in my opinion.

I think Commissioner Davidson wanted to ask a question about relating to this requirement and the cost involved

in testing.

COMMISSIONER DAVIDSON: One of the things that obviously we are concerned with is, we don't want any of the states to drop out of our program. The things that's been added, that we are adding, they are all good things. Don't get me wrong, but it is going to push up the cost of testing a great deal.

We are planning on having a, I don't know if you want to call it a symposium or what, but try to get a handle on what the cost is going to be because I think that the states need be aware of that. Also the vendors need to be aware of it or manufacturers we are now calling them. You need to be aware of what the cost is.

Its all well and good but the cost is one of the factors that's so important in elections because if we get it so expensive, the states can't afford it. I don't want any state dropping out of our program because of anything like that. So, before something goes on, we want to have this as soon as possible. We are looking at dates and trying to get some type of a handle.

That was one of the things I wanted to add that we are trying to do at our place.

DR. JEFFREY: Thank you. Three more comments and then I'm going to actually call the question. I'm just going to go – Steve

MR. BERGER: I'm going to just suggest is a result of discussion that we drop the last part of the resolution and put the period after document. Would that be more palatable to everybody? So, just drop the and are reasonably fit for use.

PROFESSOR RIVEST: Let me respond to that because my comment is along those lines to. I like the spirit of saying that a system should conform to its documentation but I think the implementation of that idea, I just don't see how it works. If a vendor says this is interoperable with machines X, Y, and Z, for example, I mean, are we going to test that?

MR. WILLIAMS: (Was not speaking into the microphone).

PROFESSOR RIVEST: Well, maybe you can educate me Brit as to what the right attitude is on this. I am trying to imagine how that works out in practice.

MR. WILLIAMS: For one thing, the vendors don't put extraneous stuff in their documentation. They are going to keep their system to the minimum they can to get it

qualified. The only time they are going to put an extra feature in there is when some state or some group of states requests it or they want to market to that state. In that case the will put in the specific state requirements. It hasn't been a big deal.

The documentation says you push the red button and it will sing the Star Spangled Banner. You push the red button, if it sings the Star Spangled Banner, it passes. If it doesn't you have either got to make it sing it or take the button off.

DR. JEFFREY: Okay, David, and then I'm going to call the question.

MR. FLATER: I guess I have a number of comments here. I have some comments in the first sentence and I have some comments in the second sentence. Let me split them up.

Let me start with the first sentence. I would like to suggest two things I think are intended as friendly revisions or amendments. You can give me feedback on whether you agree or not.

The first of those is to recommend changing for certification to for conformance to bring us into the scope of the TGDC. That is intended as a friendly amendment.

The second that I would propose is to change directs to say directs the guidelines be written so that. That's intended to clarify who this is applied to.

MR. BERGER: I can certainly accept those as friendly amendments.

DR. JEFFREY: Allan, did you get those? Okay, there was also the question of changing the TGDC directs –

MR. FLATER: directs that the standards be written so that, I'm sorry, guidelines be written so that.

My second set of comments. So, with those changes I think that first sentence seems reasonable to me from a technical point of view.

I want to now comment on the second sentence. The second sentence seems to me to really be addressing a somewhat different issue and maybe more controversial and more sweeping in its effect.

I have some concerns with the second sentence that it is somewhat imprecise and open ended in a number of ways. I can think of three ways. First of all its open ended and imprecise as to the criteria for conformance. This seems to leave that to be rather subjective and up to the testing lab.

The second, I'm concerned its rather imprecise and open ended about the level of effort of the testing that's required.

Third, I'm worried that there some open ended imprecision here by virtue of the fact that we are requiring the testing labs to test something for which there is no standard. I guess my concern here is that we've heard the recommendation from NIST staff who are the experts at writing these kinds of guidelines and standards, that the purpose of the testing lab should be solely to test for conformance to the requirements as specified in the guidelines, nothing more, nothing less. I'm a little concerned that this seems to be conflicting with that advice that we've gotten from the experts.

DR. JEFFREY: I think there was also a potential recommendation that, Steve, dividing these into two separate resolutions. As the author of this do you have any objections if we chose each of these paragraphs as a separate resolution? Its your resolution, your call.

MR. BERGER: I think I'd prefer them to be taken as a unit.

DR. JEFFREY: Okay. So, there's a resolution that's

on the table. Is there a second?

FEMALE SPEAKER 2: Second.

DR. JEFFREY: Okay, there is resolution and seconded. Open up for just another minute of discussion after that to see if there is any other clarifications and then we will vote.

PROFESSOR RIVEST: Can I ask a point of clarification for us. So, if this were to pass, I think we at NIST do not understand the implications of the first part. What types of requirements do you foresee us putting in to fulfill the first part?

MR. BERGER: I think its probably about a sentence, maybe two saying --. Let me read you a bit for the language but it would be authorizing that in the assessment of compliance failures that occur outside of a specific test can be taken into account. So, if there's latent defects that show up between formal testing or –

PROFESSOR RIVEST: So, it's a may requirement that these things may – It not a shall, its not a should, it's a may.

MR. BERGER: Yeah and I think the second one by the way also doesn't take much writing. Its more authorizing

that the test plan will reflect that match between documentation and use.

COMMISSIONER DAVIDSON: Steve, just for clarification on the first part of this. Is that really more the testing protocol that is part of the test protocol during the test campaign that the test protocol says that information, the data gathered throughout the entire testing campaign is considered as part of the verdict.

MR. BERGER: I'm not sure. Could you ask me the question in different words?

COMMISSIONER DAVIDSON: Okay. I'm trying to – so to clarify, at least for some of us that it would be in the test protocol as well specify the testing protocol that would be conducted by the labs in the test protocol would part of the test method part of the standard. There's a place for this. That as part of the test protocol it would require that the test labs not issue a final verdict on something until all the data throughout the entire testing has been completed.

MR. BERGER: I think that's correct.

MS. QUESENBERY: I if may, Steve, I'm sorry, I'm still struggling with the fact that as several of us have

said, to say that the documentation should be correct seems like a good and noble thing that we should have in there. I wondered if we simply swapped the semantics of that sentence to say, the guidelines shall include requirements to test the documentation for accuracy. If that changes the dynamic of it because then you have a finite set of documentation that you are testing rather than all functions. Maybe I'm just picking at straws here, but we keep coming back to the point is that if the documentation says that it should be true not that if its in the system, it should be documented. Which is a slightly different statement.

MR. SCHUTZER: I think there is like three different things going on here. One is the guidelines that you want to test for. One is certainly a part of the documentation, things like manuals that tell you how to do things and certainly they are misguiding you and someone in the field tries to apply the documentation to do something and it gets them in trouble I think that's valid that you should really be testing to see that the documentation is not misleading and useful.

The third is for functionality that might not be the guidelines. It might be required by one state or another

state and what you are doing there is you are sort of forcing a tester to have to read the documentation and compare it, you know, function by function, with what you have in the guidelines and (undecipherable) you put something through, you are attempting to now test for whatever else happens to be in that documentation which might be really just a province of the state or whoever it is that's requiring that additional kind of requirement that's not uniform.

DR. JEFFREY: Okay, one last round and then calling - I'm sorry Ron, you've been trying for a minute.

PROFESSOR RIVEST: I'm just not convinced that the first part says what you want it to say Steve. It says guidelines written so that data collection throughout the testing campaign be used in assessing. I mean in any given phase of the testing campaign, the data collection during that phase will be used in the assessment. So it seems that any testing campaign would satisfy this.

What you sort of mean is that things will be used in a way that they might not be, if something happens that's a failure or something that's different than what you are expecting to happen or what you are looking for during that phase. This is what I sense you are looking for but I don't

think that language captures that.

MR. BERGER: Do you have a recommended rewording there?

PROFESSOR RIVEST: No, I don't.

DR. JEFFREY: Okay, I'm going to continue going around just so we can get closure on this. Any other comments?

MALE SPEAKER 14: Mr. Chair if I could just ask one question of Ron while we are on this point.

Ron for your, if we change data collected to failures observed, do you think that reads better?

MS. QUESENBERY: Steve, what about that data collected throughout the testing campaign can be used for assessing any requirement for conformance. What you are really saying is, you can magpie it. You can pick up stuff that happens outside of the specific test and use it as part of that test.

MR. SCHUTZER: I think its fair when you say that in the process of testing for conformance in the guidelines, if in that process, you know, we find issues and problems with that vendor's equipment, then that should be duly noted and it might indeed affect your decision on the conformance testing.

MS. QUESENBERY: I think we agree here. I think we are just trying to the text to say that.

MR. SCHUTZER: Get the wording right.

MR. BERGER: How about if we just simply change from what's up there at the moment to data collected to observe -- that observations throughout the testing campaign can be used to assess any requirement.

DR. JEFFREY: Okay, I'm going to continue around, Dave.

MR. GANNON: A question on the first sentence when we get back to it. Can we get back to the resolution please?

This is in on the first sentence there, the value of federal certification. If somebody could explain to me what that means for federal certification. I thought certification is done within each state.

MR. WILLIAMS: Is the question what does certification mean?

MR. GANNON: I'm referring to the HAVA requirement that the EAC certify.

DR. JEFFREY: Okay, John, you've got the last word and then.

JOHN (?): Okay. I will make this brief. In STS one

of the things that the chair of the STS has asked us to do is write some requirements to help ensure that the documentation describing security features. That really pertains to the documentation describing overall the usability of the equipment be very understandable because the system may have all of the necessary features it really needs but if the documentation is not clear and if its hard to use then it indeed presents a security problem.

One quick example is that one report we saw of a VVPAT system indicated that it did indeed have features that could have made the paper much more usable for auditors but it was a poorly documented feature and that was a problem.

We have also had an election official report to us that this official's staff needed to rewrite documentation quite extensively for poll workers an other election officials. That was such a large effort that it impacted the operations of elections.

In STS we consider this a big issue and I would, we were planning on discussing this with HFP and so the last part of this resolution seems to address also the quality of the documentation which I think we all agree is very hard to specific in requirements right now. I would prefer, myself,

that this be discussed more in subcommittee because I don't necessarily, I think a resolution stating that this would be good to have, would be nice but I don't think it really solves the problem. I think it needs a lot more work than we can give to it right now.

DR. JEFFERY: Okay, let me get a quick sense to whether people want to break for lunch and vote after lunch or people feel comfortable so that they understand the issue and want to vote now. Just a general sense.

MR. WILLIAMS: I would like to call the question. I think we've discussed this ad nauseum.

DR. JEFFREY: Okay, the resolution is on the table. Its been seconded. Its been a call for a vote.

MALE SPEAKER 15: Can you read it into the record.

DR. JEFFREY: So, the resolution is up on the screen is what's being voted on. Is there any objection to unanimous consent?

MALE SPEAKER 16: I object.

DR. JEFFREY: Okay, then let's do a roll call vote.

MR. GREENE: This is Resolution 07-06. Williams.

MR. WILLIAMS: Yes.

MR. GREENE: Williams votes yes. Berger.

MR. BERGER: Yes.

MR. GREENE: Berger votes yes. Wagner.

MR. WAGNER: Abstain.

MR. GREENE: Wagner abstains. P. Miller.

PAUL MILLER: Yes.

MR. GREENE: P. Miller votes yes. Gale. Gale is not responding. Mason.

MS. MASON: No.

MR. GREENE: Mason votes no. Gannon.

MR. GANNON: No.

MR. GREENE: Gannon votes no. Pearce.

MR. PEARCE: No.

MR. GREENE: Pearce votes no. A. Miller.

A. MILLER: Yes.

MR. GREENE: A. Miller votes yes. Purcell.

MR. GREENE: Purcell is not here. Quesenbery.

MS. QUESENBERY: No.

MR. GREENE: Quesenbery votes no. Rivest.

PROFESSOR RIVEST: No.

MR. GREENE: Rivest votes no. Schutzer.

MR. SCHUTZER: No.

MR. GREENE: Schutzer votes no. Turner Buie

MS. TURNER BUIE: Yes.

MR. GREENE: Turner Buie votes yes. Six votes no, five votes yes and one vote abstaining. The motion fails.

DR. JEFFREY: Okay, lets take a break for lunch. Be back - let me just double check to be consistent, yes, at 12:30 and the afternoon session is introduction of any additional resolutions. Thank you very much. Come back please and again the TGDC members are welcome to join us for lunch at the same place we were yesterday.

LUNCH BREAK.

(END OF TAPE 7)

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(START OF AUDIOTAPE 8)

DR. JEFFREY: Okay. Lets get started for the afternoon session. The afternoon sessions is to introduce any additional resolutions that the TGDC wants to bring forward. Do we need to do a roll call. Okay. So I will ask the parliamentarian for a roll call attendance to check if we have a quorum.

MR. GREENE: The roll call for the afternoon session. Williams.

MR. WILLIAMS: Here.

MR. GREENE: Williams is here. Berger.
MR. BERGER: Here.
MR. GREENE: Berger is here. Wagner.
MR. WAGNER: Here.
MR. GREENE: Wagner is here. P. Miller.
MS. P. MILLER: Here.
MR. GREENE: P. Miller is here. Gale. Not responding. Mason.
MS. MASON: Here.
MR. GREENE: Mason is here. Gannon.
MR. GANNON: Gannon's here.
MR. GREENE: Gannon is here. Pearce.
MR. PEARCE: Pearce is here.
MR. GREENE: A. Miller.
MS. A. MILLER: Here.
MR. GREENE: A. Miller is here. Purcell. Purcell not responding.
Quesenbery.
MS. QUESENBERY: Here.
MR. GREENE: Quesenbery is here. Rivest.
MR. RIVEST: Here.
MR. GREENE: Rivest is here. Schutzer. Turner-Buie

and Jeffrey.

DR. JEFFREY: Here.

MR. GREENE: Jeffrey is here. At the moment we have eleven which does constitute a quorum.

DR. JEFFREY: Excellent. So at this time I would like to open the floor to the introduction of any new resolutions for discussion. Are there any resolutions?

As I have said, are there introduction of any resolutions?

MR. BERGER: First of all, Steve Berger. Mr. Chairman at the beginning of the meeting I discussed three resolutions and just to clarify there has been discussions with various individuals and I think perhaps it would be better to withdraw the first three resolutions that I discussed primarily in response to work load and respect to the objective of getting a standard out for 2007.

There are two other resolutions that were put together responding to discussions we've had heretofore and I would like to bring those up. Allan, I believe you have both of them.

The first is on principal criteria. This has been mentioned a couple of times. This is just the one that at

a high level says here is what the standard is intended to accomplish and if in any way the specific implementation fails to achieve this, the overall arching requirement of security, accuracy, reliability, accessibility and usability still are the requirements and you can fail a standard that clearly fails to achieve those.

This is the one Allan that came in an e-mail yesterday. These three I'm withdrawing. I'll tell you what, I'll read it. Give me just a moment here and I'll read it off my machine.

This is titled "Principal Criteria". No, that one is also being withdrawn.

MS. QUESENBERY: Steve in the interest of time, I have a very short one that is I think not controversial at all and maybe you guys could get the text together and we could dispose of this other one?

MR. BERGER: By all means. Go ahead.

MS. QUESENBERY: Okay. This is something that we don't actually have to act on. The ICDR is the interagency committee on disability research and their roll in the Federal government is to facilitate interagency research on topics of interest to the disabilities community. They actively seek input from stakeholders on topics for research

they can fund to bring together research communities that might not have met otherwise.

I'd like to thank the access board, David, for bringing this to our attention. He has suggested this might be a very fruitful area for them to consider but has asked that we pass a resolution saying we think it's a great idea so he has something to base his recommendation on or to base our recommendation on.

So the text of the resolution is "The Interagency Committee on Disability Research, IDCR sets the agenda for Federal disability research and actively seeks recommendations for future research topics. The TGDC recommends that the IDCR consider the topic of voting system accessibility for one of ICDR's annual conferences."

DR. JEFFREY: Okay. There is a resolution. Discussion? There is a resolution seconded. Any questions or discussions on this? If not, is there any objection to a unanimous consent? Okay, hearing no objection to unanimous consent, this passes by unanimous consent. This is 08-06. Okay. Thank you.

MR. BERGER: Mr. Chairman, I have that wording if that's.

DR. JEFFREY: Okay, why don't you read the wording and then see if we can get it into the system.

MR. BERGER: All right. The resolution is that wording to the effect that "to be certified to the standard a voting system must be secure, accurate, reliable, usable, accessible and fit for its intended use." Under that "all other requirements of this standard are established to define these requirements more clearly, apply them to specific voting system technologies and make them more objectively testable. However, in case of conflict, these principal criteria take precedence. Hence, if a candidate's voting system demonstrably is not secure, accurate, reliable, usable, accessible or fit for use, it shall be judged to fail the criteria of these guidelines."

As I said, the purpose is to provide a catchall that you can't Philadelphia lawyer your way through the requirements in some way or if we simply make a mistake and miss something.

PROFESSOR RIVEST: So, if there is an egregious security problem, of course, the system should fail and I would hope that the guidelines would cause that to happen. I think in the case of security probably the open ended

vulnerabilities test would probably be the place that would be caught.

Putting that aside, I'm just worried about the definition. I mean the point of the guidelines is, as you say, to make these requirements clear and if a – its in the definitions. If you are talking about security, for example, we are allowing, at this point continuous roll VVPAT which some people would say ought to violate the security requirements.

So the definition of what security means, you know, how you interpret your resolution depends on the details and how these things are interpreted. So, I'm just worried about how that, you know, if somebody were to decide for non-egregious reasons that the system doesn't quite meet their usability requirements or their security requirements and they fail it based on this resolution, I'm just worried how this has an impact.

The advantage of clear precise testable requirements to the extent that you can get them is that you avoid some of these issues of judgment that come up.

MR. BERGER: The implementation of this – well, first of all, the first point would be you said that the open ended

vulnerability testing should fail a system but where in the standard do we specifically say that?

PROFESSOR RIVEST: So we are writing the standard now but I mean, there will be a process by which all the systems will go through an open ended vulnerability test and that process has the capability of failing a system.

MR. BERGER: It sounds like you are going to put in language similar to this for security and I'm simply suggesting that it be covered for the other critical areas as well.

MR. WILLIAMS: I think what we are trying to do here is recognize that no matter how hard we try, we might leave things out of these standards. If a vendor comes in and he's found a path through the standard that they technically comply with, yet its obvious that the system doesn't satisfy one of these fundamental criteria, that this would give us a reason for turning it down. Whereas without this, we wouldn't have a reason for turning it down. The conformancy clause, if it meets all these individual requirements, then you've got no recourse but to approve it.

MR. BERGER: By the way, I'm modeling this off a couple of Access Board regulations, also some FCC where they

do this kind of here's what we're doing and everything else is mean to achieve this objective.

MR. WAGNER: I don't have any positive or negative comments about the resolution but I want us to be just a little cautious about drawing an analogy to open ended security vulnerability testing. I think that that analogy might not be quite appropriate.

The aspect of the open ended vulnerability testing that's open ended is the methodology. Its not so much the criteria which are open ended. If an open ended vulnerability testing finds a vulnerability that clearly violates one of the requirements stated in the standard then its obvious that that system should fail.

Of course the OEVT stuff is still being drafted and we don't know how that will turn out exactly but that analogy might not exactly be the right one for this resolution.

MALE SPEAKER 17: A question for clarification. It's a little fuzzy to me as to how this would actually be implemented by a test lab if, I understand the intent and having high level goals. I doubt there would be much dispute on the high level goals.

If a test lab tests against the specific standards and

it passes those standards, it not quite clear what it means to me for a test lab to then flunk a system based upon one of these high level goals. How would they have done a test and on what basis would they fail?

MR. BERGER: If I may and of course the certification system will be before the EAC within the next few days. As it was put out for public comment, first the test engineer at the ITA would conclude that there is a failure of sufficient weight that he could not professionally recommend accreditation or certification.

It would stop there unless the vendor then wanted to appeal that decision to the EAC, in which case the EAC very possibly, I would think likely, would have their own technical reviewers review the decision for appropriateness. The only way it would then stand would be that the technical reviewer and the ITA engineer both agreed and recommended to the EAC that, in fact, even though in some manner this thing passed all the specific written tests, there was a flaw of sufficient weight that the system should not be certified.

PROFESSOR RIVEST: I have the same concern with the details of the implementation. Again, the high level

principle seems sound and in fact it is indeed pretty close to what we are doing in the security area with the OAVT. Maybe you want to propose an implementation process too but the resolution as it stands doesn't say how, I don't think, how this would be implemented.

MR. BERGER: Well, I think that's in the certification program that the EAC will take up and in that program the test labs test a system and forward a test report with a recommendation to the EAC. The EAC then has their technical reviewers review the report, make a recommendation and then the commissioners ultimately make a determination, or the certification authority that the commissioners appoint make a determination.

Those are really the three parties, the test engineers, the technical reviewers and ultimately the EAC.

MS. QUESENBERY: So, I have two questions. One is a general question I think that would apply to the opened vulnerability testing as well which is how do you prevent, we've talked about rotten COTS, how do you prevent a rogue tester from having a personal agenda or a corporate agenda.

I know we certify labs and all sorts of things but, nonetheless, people certainly have personal biases in an

area that's complex. So, that's a general question.

The other is if this is really about the certification process, shouldn't this be part of the certification process and not part of the TGDC as admirable a goal as I think it actually is. I agree that there can be problems where you've met A, B. C, and D, but you still haven't actually achieved zero.

That sounds to me like a judgment call that you would want to have presented to the EAC from the certification process rather than something that should be written into the requirements.

MR. BERGER: Well, this is the kind of mechanism that the standard really needs logically to allow both the innovation class and the equivalent facilitation that you recommended yesterday because when you think about that, if you come in and you say there is an innovation and its just as good as what's intended by the standards, where in the standard does it say what's intended by the standards.

MS. QUESENBERY: But as I understand the working concept behind the innovation class, it isn't that any vendor can walk in and say I do it better, but that when a vendor or a designer of a piece of equipment has an idea that they

think will work there is going to have to be some process by which somebody thinks about how it gets certified or not. So, there already is – well, jumping ahead, if implemented as people have been discussing it there would already be a bit of a process worked in for someone to say, well, how would be judge this sort of system so it doesn't become a complete one off for one vendor but become a way of evaluating that idea against perhaps multiple vendors.

DR. JEFFREY: Mark and then Dave.

MR. SKALL: Thank you. A couple of points. I think the certification discussion could be satisfied by changing the word certified to conform to the standard, I think is what you probably mean.

Let me get into the more substantive part. In drafting the standard, what NIST and the TGDC, I believe, tried to do is start with high level requirements and we worked down the tree till we ended up taking those high level requirements and making them tests. So, essentially we have words in there that are at a high level like this but the way the standard was developed is that the shall requirements are what ended up being at the bottom of the tree because we wanted to put testable requirements in.

I think what this is saying is we are starting with these high level requirements, we have testable low level requirements and I think what this is saying, in case we missed any of those low level requirements, you are leaving an opening to say here's a high level requirements. We put these in at the bottom of the tree but perhaps we left some out so lets go back up to the top level. The only issue I have with that is, again, the top level requirements are not testable until you flush them out.

MR. BERGER: I agree. Actually Mark, a couple of times I've gone back to the standard and I may have missed it but I can't find the language you referred to. I think what it says is it talks about it in general terms but it doesn't specifically say these are the high level requirements we are now implementing with all this other and therefore clearly within the document point out that you really have to comply with these and evidence of compliance is for every foreseeable case, that you pass all the other requirements.

MR. SKALL: Right. So we could say that. We could cite the high level thing and say, evidence of compliance are reflected by the shall requirements at the lower level.

So the question is what else do we say? Do we say in fact there may be things missing which I think is what this implies and, if so, how do you do that precisely.

MR. BERGER: I think that's the only additional point is that if there is something that is really egregious and missing. I would be comfortable with some language.

DR. JEFFREY: Dave then Brit.

MR. FLATER: I love the goals of this. I think this is really, I think the goals are really laudable. I want to mention a possible idea, brainstorming here that I wonder whether might help accomplish your goals.

Right now I think the model is that the test labs are charged to provide a recommendation about whether equipment is conformant or not. There job is to assess conformance.

Suppose that we interpreted this resolution to mean that test labs are now empowered that they may, if they wish, exercise their professional judgment to additionally provide a recommendation if they feel that it doesn't meet these high level goals. Maybe its technically conformant with the requirements, the low level requirements as drafted, but if it doesn't meet these goals, that they may additionally

provide a recommendation to the EAC for use in their certification decision.

MR. BERGER: If I may, as currently drafted the EAC certification program has the test lab send their test plan to the EAC for review. So, if you had a test engineer who is out of line, I feel pretty confident the test reviewers will reject the test plan or at least send it back for modification.

I think that there's a check and balance built into the system already.

MR. WILLIAMS: I am trying to get this down to where the water meets the wheel so we can get out of here.

Mark, if we put in the introduction words to this effect that the goals are to achieve these things, would that then Steve, not give the EAC certification a crack in the door that they could go through if something like this did fall through the cracks and assist if a vendor came along and managed to weave his way through the certification process through the guidelines on technicalities, but the certifying people felt that some of these criteria weren't met.

MR. BERGER: Saying it's the goal I would have no problem with but that's different than saying you must adhere

to these principles to conform. Those are two different things.

So are you suggesting that this gets changed for the guideline to say the goal is to achieve this and thus give EAC discretion. I think that's a more palatable solution.

MR. WILLIAMS: That's fine. That keeps you in your conformance mode and gives the EAC the crack in the door that they need to come back on a system that, in the event that it did squeak through.

Believe me in the past we have had some vendors attempt to pull legalities on us and say look, we are meeting the technical specifications. You've got to approve us.

MR. BERGER: I think that's a much more palatable approach.

MS. QUESENBERY: I agree. Its certainly works in things like plain language and accessibility where you really, its very hard to write a very, very precise requirement. So, if you start with a goal and say in the service of this goal we have written the following detailed requirements it leaves a lot of room for innovation class stuff to come back or for someone to say there is another thing in being able to know whether you are going off course or not.

DR. JEFFREY: In terms of plain language, I am going to ask someone to actually suggest the modified language so that when we vote on it we all know what we are voting on.

MS. QUESENBERY: That's a good idea.

MR. BERGER: Let's see, who's our plain language expert?

MS. QUESENBERY: Right from the very beginning, Eleanor, or whoever is typing, the guidelines shall include high level goals for the, do we need that whole list? Shall include a statement of the overall goals of the guideline. No, back up from high level, back up two words. Now delete the rest of the line. I should just go type it.

DR. JEFFREY: Microphone please.

MR. WILLIAMS: The overall goal of this guideline is to produce voting systems with the following attributes: bing, bing, bing, bing.

Now what about the bottom part of it, Mark? How's that?

MR. SKALL: It seems to me the bottom part is really not necessary since we are now just talking about a goal rather than anything that affects conformance.

You can check, its your motion Steve, but that's my

interpretation.

MR. WILLIAMS: My recommendation is that we keep that last sentence and delete everything else. So (undecipherable) it began the voting system demonstrably is not secure, accurate, reliable, blah, blah, blah, it should be judged to fail the requirements of these guidelines. Is that too general?

MR. SKALL: I think that's a little different than what we discussed. We discussed that the EAC could use that information to make determinations of certification. So, they would conform because this is not part of our conformance clause but we could say that the result of this information may be used by bodies determining certification. Something like that.

Something like perhaps whether or not the goals have been reached may be used as information to help determine certification.

DR. JEFFREY: The plain language is really important in the guideline itself, less so in the resolution to get to the guidelines.

MR. BERGER How about something like in addition to testing for conformance with the detailed requirements

of the guidelines, certification may depend on the EAC's assessment as to whether the voting system meets these high level goals adequately.

DR. JEFFREY: Ron do you want to repeat what you said?

PROFESSOR RIVEST: This is consistent with what you said.

DR. JEFFREY: Steve are you? Okay, there is a resolution on the table. I don't believe its been seconded yet.

MALE SPEAKER 18: Second it.

DR. JEFFREY: Okay, the resolution has been seconded. Presumably its still be seconded. Is there any further discussion on this resolution?

Okay, hearing no further discussion I'll call the vote. Is there a call for any objection to a unanimous consent? Okay, hearing no objection to adopting by unanimous consent, this is adopted. This is 09-06.

Okay. Thank you. Are there any other resolutions? Okay. Steve, you've still got more in you.

Let me just, in terms of time, how many resolutions? Are there any other resolutions that anyone at this moment is planning?

MR. BERGER: Just a point of discussion but not resolution.

DR. JEFFREY: Does Allan have your copy?

MR. BERGER: I believe so. Allan this is the one on basically applauding the move from MTBF to probability of failure during an election.

DR. JEFFREY: So if you can bring that quickly we will discuss this one. Otherwise we'll go to the other discussion.

So there's at least two for discussion, one resolution and at least two for discussion. Anything else. Okay, just to gauge time.

If you could, yeah –

MR. BERGER: Yesterday there was some presentation on the difficulties of the reliability metrics and a couple of research papers that, in my view, have some excellent points they make.

I would summarize what's said there and I would like to make a resolution that we applaud and recommend moving reliability from a Mean Time Between Failure metric to a probability of failure during an election metric. You heard a lot of the discussion yesterday.

I think clearly what we are interested in is what's

the chance that equipment will fail during an election. Mean Time Between Failure is a common metric but it doesn't exactly measure that and I just wanted to officially as a committee say that we endorse that movement.

DR. JEFFREY: Any discussion. Dave, do you want to say something?

MR. FLATER: I have a question. In a context of the presentation yesterday, discussion led up to calculate a revised benchmark. One of the inputs to this is what proportion of devices you can tolerate failing during an election which maps exactly to the probability of failure.

My question is it sounds as if what you are trying to recommend is to use probability of failure itself as a benchmark. The question is that doesn't seem to give you any of the context you need to evaluate conformity to the benchmark. You need to know probability of failure under what conditions, with how much volume, etc.

So, a volume based benchmark at least tells you probability of failure given a certain amount of volume whereas if you simply say the probability of failure, its context free. You have to say probability of failure in

whose election?

MR. BERGER: I think a lot of the detailed discussion we probably would be better to take by to subcommittee because as you know, there is a lot of detail to discuss.

For general discussion let me just point out that Mean Time Between Failure just says on average half your equipment is going to be broken at this point in time. It doesn't say what the distribution is or what will happen in an election.

So, let me give an example. Let's say because of aging of plastics under different kinds of storage conditions, we know that ninety percent of, let's say the rollers in the printer will be so hard that they will jam continually when they are stored under certain kinds of conditions, let's say four years.

The rest of them will be so hard and outcast and brittle that they will equally fail at eight years, stored in other states in other climatic conditions. The Mean Time Between Failure would say that you have an average failure of six years but what would actually happen is almost all the devices in some states would fail at your election at the four year mark and the rest of them would fail at eight years. I

think we want to identify that kind of grouped failure rate, probability of failure in the evaluation.

DR. JEFFREY: For clarification is your resolution to, the way I heard it when you said it was actually to just move that you applauded moving from the MTBF framework into the framework, essentially, as briefed, but not necessarily get to the specific that I think Dave you interpreted to very specific approach.

Was it the general framework that you applauded moving away from MTBF as the actually matrix.

MR. BERGER: I was really trying to get the committee on record appreciating and endorsing what was briefed and what was in those two research papers. I think that was excellent work.

DR. JEFFREY: You were basically endorsing the approach that David briefed yesterday.

MS. QUESENBERY: Haven’t we actually done that by accepting the report?

DR. JEFFREY: I would view those as consent. Yes. Given no other direction I think that’s the approach David and his team would be continuing to work. I certainly don’t object to a resolution applauding them for great work and

encouraging them to continue.

I'm surprise that David objected to it but –

Let me just make sure that we are saying the same thing though. David could you reiterate in sort of thirty to sixty seconds, exactly the approach that at this moment you believe that you've been given the guidance to pursue on this issue and see whether or not this captures what you are recommending.

MR. FLATER: The guidance that I thought I had received was, given probability of failure as one of the inputs, in addition to other context, that we would then calculate benchmarks to ensure that given with the model that we are assuming that the probability of failure in an election would be less than that.

DR. JEFFREY: Okay. Do you feel that we need a resolution to. Do you still want to propose a resolution since that's the direction the sense of the committee seems to be anyway.

MR. BERGER: David, let me just say, I think what you said is what we want and that's clearly moving away from Mean Time Between Failure which I think we are agreed is not the right metric. Right.

MR. FLATER: I agree.

MR. BERGER: Then just let me make a resolution applauding that.

DR. JEFFREY: So the resolution is to applaud David. You can tell its late on the second day. So the resolution, if I could propose, is that –

MR. FLATER: I think that’s eloquent.

DR. JEFFREY: Its plain. So the resolution, if you want a resolution, I believe what you are saying is that the committee concurs with moving away from MTBF as the benchmark. Its simple.

While that’s being typed I think that’s simple enough that we can handle it. Is there a second to that?

MS. QUESENBERY: I second it.

DR. JEFFREY: Any further discussion? Any objection to unanimous consent?

Okay. Its so passed. This is 10-06. The TGDC concurs with moving away from MTBF (Mean Time Between Failure) for those who keep forgetting the acronyms. Okay.

Thank you David. Ron you had a point for discussion?

PROFESSOR RIVEST: Just maybe a point of notice. I want to just revisit quickly a topic that Nelson Hastings

had addressed and to just make it a little bit clearer when the STS committee is going in one area.

We talked a little bit about crypto modules and hardware modules and so on. I just wanted to make it clear to my colleagues on the committee that it's the plan of the STS to push for requirements that make hardware crypto modules mandatory in the voting systems so that they can control accurately the keys to communication, to authenticate the communications between various modules.

This is a hardware requirement and as such, I think its significant and will require discussion among the members. I look forward to discussions both within STS and the joint meetings between STS and CRT and so on or any other form that the committee members like. I think it's a direction that from a security viewpoint, has a lot of benefits.

I think since it is a hardware requirement, not something simple like some of the software requirements that we have, I think its worthy of discussion. I'm not proposing that we discuss it here, but I just want to make sure that my colleagues here know that we are looking forward to moving in this direction should the rest of the committee agree.

DR. JEFFREY: Thank you. David did you –

MR. FLATER: Yeah, I just wanted to bring up a topic for feedback on what kind of direction. I think one of the things that might be useful to think about is how we can reduce barriers to introduction of new innovative voting systems that might have better accessibility and security.

One of the ones that most lead to mind, my mind, at present is electronic ballot marking devices but that might include others. So, one of the things that I was thinking might be useful to think about over the next few months was whether there is anything that can be done to reduce the barriers to introduction of those to the market.

Just to give you some sense of very early thoughts on where one might go with that. It might make sense to look to see whether there are any requirements in the standard that were developed before people were thinking much about these new devices that aren't needed and are unnecessary and put an unnecessary burden on introduction of these devices.

The other issue that maybe we are thinking about some is the inner operability. Can we encourage the development of these new systems by enhancing in inner operability perhaps through open exchange formats or something like this.

I would welcome any course, corrections or guidance from folks, both is this a useful goal to think about and second are these useful directions to do so. I welcome guidance now or later.

DR. JEFFREY: Okay. Please provide David guidance. Let me ask Mark are there any open issues or any points of confusion that you feel was not adequately addressed? That's right, I'm sorry.

Are there any more resolutions or issues?

MALE SPEAKER 19: I'm not sure that we formally approved the STS report because we got derailed with the SI issue.

DR. JEFFREY: That's absolutely correct. Let me –

MALE SPEAKER 19: Paper roll was too but I think that Dan is not here anymore to propose it unless somebody else wants to.

DR. JEFFREY: Let me clear off the STS because we did postpone until this morning. So are there any open issues or confusions on the STS before I ask whether or not we can officially approve the preliminary report. Any issues from the STS? Okay. Hearing none.

MR. WILLIAMS: We are moving it with the resolutions

involved.

DR. JEFFREY: Yeah, yeah absolutely. The Security and Transparency Subcommittee has provided a preliminary report that I believe, I've got the number right, I think about a response to eleven different TGDC resolutions that have been provided.

Unless there is additional direction, given the resolutions, given the feedback that they have received during this meeting, they will then continue to develop their guidelines consistent with the path that they had outlined, moderated by the resolutions and the discussions.

Are there any further questions or issues on what you've heard from them? If not, do I hear a motion to adopt their report as modified by the resolutions and discussions?

MS. QUESENBERY: So moved.

DR. JEFFREY: So moved. Any objections to unanimous consent? Hearing none. I think they've got their direction then. It passes by unanimous consent.

MS. QUESENBERY: You need a second.

DR. JEFFREY: I'm sorry. I forgot a second. Is there a second?

MALE SPEAKER 20: Seconded.

DR. JEFFREY: Now is there an objection to unanimous consent? Would you like job as parliamentarian when he goes to New Zealand. Anyway, so that passes by unanimous consent. So, I'll do one last call for any new resolutions, issues. Yes.

MR. BERGER: Maybe this is not an appropriate time to introduce a resolution commending NIST on their excellent work since our last meeting. I think they have dealt with a large range of very tough issues and I think they deserve a round of commendation for a job very well done. Not that its complete yet.

DR. JEFFREY: Well, rather than a formal resolution, I think they are just happy to be here. Thank you on that.

Let me move into one last logistic issue. I think every TGDC member should have a list of potential meeting dates for the future. I believe its appropriate to consider two options.

One is that we would have two meeting between now and the July deadline so that we could review all of the work that the subcommittees have been tasked to do and that would be probably a meeting March and June.

The second option is to have one meeting probably in

the May time frame to see about the progress and that would again be the last real opportunity to make changes.

Is there a sense as to whether or not one meeting or two meetings. Again, the potential dates, you should have a sheet in front of you.

MR. BERGER: I don't know my calendar well enough to judge these.

DR. JEFFREY: We can accept the actual date because one of the thing we need to do, I need to check with the EAC calendar and other to make sure that there is no conflicts. So don't worry so much about the specific dates. The bigger issue is should be aim for two meetings between now and July or do we believe we can handle all this work with one.

(**END OF AUDIOTAPE 8**)

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CERTIFICATE OF AGENCY

I, Carol J. Schwartz, President of Carol J. Thomas Stenotype Reporting Services, Inc., do hereby certify we were authorized to transcribe the submitted cassette tapes, and that thereafter these proceedings were transcribed under our supervision, and I further certify that the forgoing transcription contains a full, true and correct transcription of the cassettes furnished, to the best of our ability.

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CAROL J. SCHWARTZ

PRESIDENT