



System Usability Scale: Application and Interpretation in Military OT&E

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Release Date: 27 Mar 2017



Introduction



- **What is the SUS?**
- **How SUS is administered and scored**
- **What SUS does and does not tell us**
- **Practical use of SUS with space program**
- **Suggested alternatives**



BLUF



- **SUS has proven itself to be useful from a consumer software perspective**
- **Currently there are no existing benchmarks for the interpretation of the SUS numerical score with military systems**
- **It does not adequately scope the usability attributes of military systems under test**
- **Let's consider an alternative for creating meaningful usability ratings for military systems**



SUS Background



- **Developed in 1986 by John Brooke while at the Digital Equipment Corporation**
- **“Quick and dirty usability scale”**
- **Designed for DEC’s ALL-IN-1 software**
- **Generic usability scale for consumer products**
- **Meant as a high level assessment of usability**
- **Not intended to provide diagnostic information**
- **SUS scores can range from 0-100 (not a percentage)**
- **DOT&E memo: “Guidance on the Use and Design of Surveys in Operational Test and Evaluation (OT&E)” dated 23 June 2014; guidance incorporated into AFOTEC Questionnaire Guide.**



System Usability Scale



System Usability Scale

Digital Equipment Corporation, 1986.

	Strongly disagree				Strongly agree
1. I think that I would like to use this system frequently	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	1	2	3	4	5
2. I found the system unnecessarily complex	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	1	2	3	4	5
3. I thought the system was easy to use	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	1	2	3	4	5
4. I think that I would need the support of a technical person to be able to use this system	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	1	2	3	4	5
5. I found the various functions in this system were well integrated	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	1	2	3	4	5
6. I thought there was too much inconsistency in this system	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	1	2	3	4	5
7. I would imagine that most people would learn to use this system very quickly	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	1	2	3	4	5
8. I found the system very cumbersome to use	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	1	2	3	4	5
9. I felt very confident using the system	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	1	2	3	4	5
10. I needed to learn a lot of things before I could get going with this system	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	1	2	3	4	5



System Usability Scale



System Usability Scale

Digital Equipment Corporation, 1986.

1. I think that I would like to use this system frequently → Like to use
2. I found the system unnecessarily complex → Complex
3. I thought the system was easy to use → Easy
4. I think that I would need the support of a technical person to be able to use this system → Need tech support
5. I found the various functions in this system were well integrated → Well integrated
6. I thought there was too much inconsistency in this system → Inconsistent
7. I would imagine that most people would learn to use this system very quickly → Quick to learn
8. I found the system very cumbersome to use → Cumbersome
9. I felt very confident using the system → Confident
10. I needed to learn a lot of things before I could get going with this system → Too much to learn



SUS Analysis



System Usability Scale

Digital Equipment Corporation, 1986.

	Strongly disagree				Strongly agree
1. I think that I would like to use this system frequently	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
	1	2	3	4	5
2. I found the system unnecessarily complex	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	1	2	3	4	5
3. I thought the system was easy to use	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
	1	2	3	4	5
4. I think that I would need the support of a technical person to be able to use this system	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
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6. I thought there was too much inconsistency in this system	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	1	2	3	4	5
7. I would imagine that most people would learn to use this system very quickly	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	1	2	3	4	5
8. I found the system very cumbersome to use	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
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	1	2	3	4	5
10. I needed to learn a lot of things before I could get going with this system	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	1	2	3	4	5

SUS Score
70



What SUS does and does not tell us



- **SUS has demonstrated good reliability and validity for consumer systems**
- **SUS measures system usability**
- **SUS measures system learnability**
- **SUS does NOT indicate why a system is or isn't usable**
- **SUS is NOT a diagnostic tool so it will not identify what needs to be fixed**
- **A high SUS score does NOT indicate successful mission/task accomplishment**



SUS with a SUT



- **Real-world test of multi-billion dollar program**
- **Individual respondents: 111**
- **Average SUS score: 55 (F)**
- **Post SUS interviews and test team observations indicated the system user interface did have some room for improvement but was not entirely lacking and allowed for mission accomplishment**
- **Interviews/observations indicate SUT usability = B-**
- **Currently there are no existing benchmarks for SUS interpretation with military systems**
- **The SUS data had limited value for this program**



Suggestion 1



- **Limit SUS to EOAs/OAs**
 - High level view of a growing system's usability
 - Use SUS as “A quick and dirty usability scale”
 - Concurrently test team will continue detailed scope of specific system usability attributes



Suggestion 2



- **Add a 7-pt rating scale as an 11th item to the SUS**
 - **Use of an adjective rating scale will greatly aid interpreting SUS scores for military systems**
 - **Similar to work done by A. Bangor, P.T. Kortum, J.T. Miller (2009)**

11. Overall, I would rate the usability of this system as:

Completely Unacceptable	Moderately Unacceptable	Slightly Unacceptable	Equally Acceptable & Unacceptable	Slightly Acceptable	Moderately Acceptable	Completely Acceptable



Suggestion 3



- **Create a list of usability attributes specifically tailored to the system under test**
 - **Gather observations/ratings for each usability attribute**
 - **Identify problem areas and provide recommendations to system engineers and operational users**
 - **Identify and preserve well-designed areas of user interface**



Conclusion



- **Every test is different**
 - There is no one-size-fits-all measurement solution
- **Rating instruments should be customized for each test**
- **SUS is one tool in the toolbox**
- **Are there other suggestions or methods to assess software usability with military systems?**

Software Usability Working Group?



