HCI NASA Group

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Appendix F
User Testing Transcripts

All Iterations of User Testing

First User Testing Iteration Participant Profiles

Before commencing with the user tests, we gave our users a survey. (F6) The surveys were not used for the Operational Readiness Tests, below. (F27)

First User - Former Facility Manager

We didn't expect this user to be very accurate, and intended to use him as an external check upon the interface and its basic functions, in advance of more accurate users.

In his sixties, this user has a Masters in Mechanical Engineering. He uses his office computer for spreadsheets, writing reports, and email. Problem reporting is not a part of his job. He has a cell phone for personal use only, and has used Graffiti in the past. He owns a laptop. He uses eye and ear protection when nearby an Arcjet laboratory, but for the most part works in a standard office environment.

Second User – Engineering Technician

Our most accurate user; he was a user in all of our testing iterations. (40, 43)

A technician in his fifties, he uses his computer to email a purchasing department and manufacturers, as well as for troubleshooting. Problem reporting is a major part of his job but typing them is not. He owns a cell phone, a PDA, and a pager, all used for work.

He's never used text messaging, but he has used picture mail, T9, and Graffiti. He owns a personal computer, but not a laptop. He wears eye and ear protection around shops and noisy environments, and gloves when lifting and moving parts.

Third User – Test Engineer

This user was expected to be accurate, but unfortunately was not. He was an engineer, someone who resolved problem reports, not who reported the problems.

An engineer in his forties. He has a Masters in Mechanical Engineering, and uses a computer as part of his job. Problem reporting is not part of his job; he types up the reports on his computer. He owns a cell phone and PDA, and uses the latter for work. He has used picture mail in the past and is apparently an expert in Graffiti.

He owns a laptop and uses email. He uses safety glasses, ear protection, gloves, and safety shoes while working with the Arcjets, which are a very noisy place.

First User Testing Iteration Task Script and Transcripts

See below for the papers brought to these user tests, & the resulting transcripts. (F16)

Field Definitions

* = required fields

Basic Problem

Summary - A short sentence describing the problem (e.g., HGA antenna servo failure)
Linking - Enter the ID number for each problem that is related to the current problem in order to create a link
Problem # - The unique ID number associated with the problem
Mission Name - Mission name within project, e.g., STS 114, GOES-N
Component - The component the problem is related to
Product - The project the problem is related to
Severity* - The impact of the consequences caused by the problem
Status - The stage of processing the problem is currently in (e.g., open versus signature)
Reporter - The email of the individual user who initially entered the problem
Assigned To - The email of the individual user who is currently assigned as the problem owner
Add CC - An individual user who should receive email notification related to the problem
Occurrence Date - Date that problem occurred
Occurrence Location - Geographical or orbital location of the anomalous item when problem occurred
Detection Date: Date when problem was detected
Detected During: Description of the activity that was occurring when the problem was identified, e.g., analysis, functional test, envionrmental testing, shipping & receiving, maintnace, work authorization document number, ect.
Lifecycle Phase - Phase of mission when problem occurred
Inflight Anomaly - If this problem occurs during the mission, then it is an In-Flight Anomaly.
Process Escape - Was there a process escape?
Problem Description* - The Problem Description is a complete and succinct explanation of the problem. It should include information that will assist in identifying the cause of the problem: Lowest level the problem has been isolated to (SRU, OERU, System, or Subsystem) Actual performance versus specification/ expected performance (is… should be…) Where the problem occurred What was occurring when problem was identified (During step XX of procedure YYYY) Identify the document, process, procedure, or drawing, etc. that may be discrepant
Immediate Response - Description of initial actions that were taken to respond to the problem as soon as it was discovered; e.g., remove-replace, securing
Defect Code - The defect code that most closely matches the type of defect the problem is based on analysis of the problem.
Previous Occurrence* - Has this or a similar problem happened before in this mission or others?
Additional Comments - A place to enter comments that do not fit into the other fields (note: field content will be marked with the time/date stamp and the identity of the user who entered it each time the problem is saved (similar to blog entries)

Problem Analysis

Analysis POC - Name, organization, email, telephone, & role of person who has been assigned to analyze the problem
System - Hierarchical identification for various levels to pin-point where the anomalous item fits within the system (various levels are defined in the NASA SE Handbook)
Subsystem - Hierarchical identification for various levels to pin-point where the anomalous item fits within the system (various levels are defined in the NASA SE Handbook)
Consequence Score / Severity - Determine Severity of Problem (1, 2, 3, 4, or 5) based on CxP 70056
Likelihood Score* - Determine Likelihood of Problem occurring again (1, 2, 3, 4, or 5) based on CxP 70056
Investigation Analysis Description - Description of the steps taken during the investigation and analysis to determine the corrective action. The I&A section provides a current status of the investigation and at the time of PR closure will provide historical summary of the logical trail of events that describe how the team identified the cause(s) of the problem from initial observation of the problem to the identification of the cause(s) of the problem. The Investigation and Analysis Description field should be updated to contain the current state of the investigation. Should include an evaluation of related anomaly or nonconformance history and any previous corrective actions implemented to make certain that generic design, fabrication, or other issues do not exist. Identify and summarize the analyses, fault trees, troubleshooting plans, etc. that support the disposition of the hardware. (Fault trees, cause and effect diagrams, supporting analysis, etc. should be attached as related documents).

Assess the adequacy of any interim corrective actions implemented to assure that no other actions are required until permanent corrective action and recurrence control can be implemented or determined unnecessary.
Cause Type - Indicates the type of cause. Only one Root cause should exist per record
Cause Code - he cause code that most closely matches the root cause (or probable cause if root cause is not known).
Cause Description - Description of the cause(s) of this problem.
Corrective Action/Recurrence Control POC - Name, organization, email & telephone number for person responsible for implementation of the problem resolution.
Corrective Action/Recurrence Control - Description of final resolution to prevent reoccurrence of this problem or to minimize its impact - a systemic fix - "prescription" for what would be information to be included is provided
Waiver Deviation* - Has a waiver or deviation been issued for this type problem before or does a waiver or deviation need to be issued?
Resolution Actions
Problem Type* - Identification if a hardware problem, software problem, GSE/facility hardware or software, or process problem
Part Number - Configuration Item Name and Part number that the anomaly/nonconformance/problem was isolated to.
Part Name - Configuration Item Name and Part number that the anomaly/nonconformance/problem was isolated to.
Next Higher Assembly - Configuration Item Name and Part number that the anomaly/nonconformance/problem was isolated to.
Assembly Level - Level that the anomaly/nonconformance/problem was isolated to.
Part Manufacturer - Manufacturer of anomalous/nonconforming/problem assembly/component
Location on System - Zone location on hardware itself, if applicable
Part Integrator - Cage Code of the manufacturer of anomalous/nonconforming/problem assembly/component
Disposition Type - Description of what was done with the anomalous/nonconforming/problem item
Serial Numbers - Serial numbers that the anomaly/nonconformance/problem was isolated to.
Usage Constraints - Describe constraints such that processing of a part/system can't go past point until this problem is resolved.
Remedial Action POC - Name, organization, email, & telephone for person/team responsible for resolution development
Remedial Action/Disposition - Description of resolution to correct the problem in its current occurrence - "prescription" for what would be information to be included is provided
Other:
IFA# (If Inflight Anomaly) - If checked yes to IFA, need IFI number here. Generate automatically based on what IFI process ends up being.
Process Escape Description (if Process Escape) - Description of the process escape, list of processes names/numbers that are applicable
Unexplained Anomaly - Indicates unexplained anomaly.
Waiver Information - Attach applicable waivers/deviation documentation
MRB Required - Does this problem need to be referred to the Materials Review Board?
MRB Rationale - Attach supporting MRB documents used to disposition hardware

Introduction

"Hi, we are CMU students working with the Human-Computer Interaction group at NASA developing a mobile device for problem reporting. Do you have 10 minutes to test out and interact with a prototype that we have developed? We have made a paper prototype of what will be the screen interface mobile device that we'd like you to walk through. What we are going to do is use your feedback to reiterate on the design of the prototype. It will be very useful for designing an interface that is easy for users to use, useful and enjoyable to interact with. The data will be used for research purposes only and we will not be using your name or any other personal information."

Description of Think-Aloud

We have a sample scenario and set of tasks that we'd like you to follow by pretending as though you are in the situation and interacting with the prototype as if it were a real, working device. While you are following the steps we'd like you to think out loud and say what you are thinking and your reactions at all times, as well as what you are doing. We'd also like you to say how you know what information to input. We will be taking notes while you are talking. Please keep talking during the entire study.

Pre-Qualifying Questions

Background

Name :_____

Organization:_____Facility:_____

Job Title:_____ Years Experience:_____

Previous Job Title:_____ Years Experience:_____

Age:_____ Dominant Hand:_____

Degrees or Certifications:_____

_____

Experience

Do you use a computer as part of your job? Y N

If yes, how so?

Is Problem Reporting a major part of your job? Y N

Is the actual typing of reports a major part of your job? Y N

Describe:

Do you have a (circle):

Blackberry Cell Phone PDA Other device:_____

Do you use it for work?

Do you use or have you ever used text messaging? Y N

Picture mail? Y N

T9? Y N

Graffiti? Y N

Describe your computer experience.

Do you own a personal computer?	Y	N
A laptop?	Y	N
Do you use a computer at work?	Y	N
Do you use email?	Y	N

Context of Use

Do you wear:

Eye Protection? Y N

If so, describe:_____

Ear Protection? Y N

If so, describe:_____

Gloves? Y N

If so, describe:_____

Work clothing? Y N

If so, describe:_____

Please describe your workplace (e.g. noise / lighting / space / constraints, if any):

Task Script

1. Using the **on-screen keyboard**, create a **new nonconformance report** to document the crack.

2. Enter data into the screen interface of the device **at the work site.**

3. Take a **picture** of the crack as an attachment to the report.

4. **Submit** the report.

5. Sync the report with the **computer workstation** and enter any other data on the computer.

6. **Save changes** to the problem report from the computer.

7. Repeat using the **keyboard on the device**.

Our system is designed such that problem reporting from both the mobile device and/or a computer workstation. Report drafts saved or or reports submitted through the mobile device can also be viewed on the computer workstation by docking it. The device will auto-sync with the computer and show what is currently open on the device.

Scenario:

- The shuttle (Discovery) has returned from flight. You are performing an internal inspection on the outboard edge of the left wing in the Maintenance / Refurbishment department.
- The lower half of the Reinforced Carbon-Carbon on the Panel 8 of the Thermal Protection System was damaged due to debris impacting the wing in of the shuttle while in-flight.
- You find that there is a crack through the rib of Reinforced Carbon-Carbon, a common problem that occurs when structural damage occurs to the shuttle. Already a few cracks have been found in the RCC Panels 6 and 7, an RCC material failure
- Debris lodged in cracks in RCC panels, identified as the likely cause of crack. Measured at 5.5 inches, linear, direction of growth is away from outboard edge. The crack does not run through the sensor on the rib by .5 inches. Continued branching is likely to occur. Debris was lodged in the crack at 1 ¼" and at 3" from the end at the outboard edge. The debris was not removed, for further investigation.
- With further crack growth in-flight, the specific structural damage would probably have allowed enough superheated air to penetrate the wing during re-entry to cause serious damage.
- However, you need further investigation and analysis of fault trees, history, and diagnosis of cause(s) (e.g. aerodynamic and thermal analysis of velocity / impact) in conjunction with a subject matter expert / engineer before being able to determine remedial action to the problem so you may choose not be able to fill out all fields in the report.

Wizard notes:

[Log in to the device]

1. Create a new problem report to document the crack.

-Click "New Problem Report"

2. Enter some of the data into the screen interface of the device at the work site [Below is an example work flow, not to be followed explicitly by user]

Already filled: (bolded in data list)

-Click "Summary" text box

-Enter "Summary" title (do we want some way of assuring consistency?? two text boxes instead of one, etc.)

-Drop down predictive search

-Select item from drop down

-Continue entering title -- next word

-Drop down predictive search

-Select item from drop down

-Click "Severity"

-Select item from drop down

-Scroll down

-Click "Previous Occurrence" (saw link to similar problem report)

-Select item from drop down

-Select "Additional Comments"

-[mark reminder to be completed later]

-Click "Analysis" Tab

-Click "Cause type"

-Select from drop down

-Click "Cause Description"

-[mark reminder to be completed later]

-Click "Resolution" Tab

-Click "Part Number"

-Enter part number

-Drop down with possible part numbers related to that work step

-Select item from drop down

-Auto-fill "Part Name" when part number selected

-Scroll down

-Click "Serial Number"

-Enter serial number

-Drop down with possible serial numbers related to that work step

-Select item from drop down

-Click "Usage Constraints"

-Enter constraints

-Click "Signatures & Closure"

-Click attachments

3. Take a picture of the crack as an attachment to the problem report.

[Zoom into the picture. Annotate the picture to indicate direction of growth of the crack]

[Take a picture of the serial number and attach it to the "serial number" field]

[Scan a design document. Circle the area of the part.]

4. Submit the problem report.

5. Sync the problem report with the computer workstation and finish entering the data on the computer.

-From Basic tab, Select "Additional Comments"

-Enter additional comments

-Auto fill (provides list of predicted words)

-From Analysis tab, Click "Cause Description"

-Enter description

-Auto-fill(provides list of predicted words)

[Request analysis from engineer]

6. Save changes to the problem report from the computer.

[Request approval from a quality personnel.]

The following is the known data that is available to be collected in the problem report:

Problem Report #: 347128

Summary Title: Crack in rib of RCC Panel 8

Work Area/Location/Zone: RPSF LVL2

WAD work step: B5309.012 RAB Step 60-5

Related Reports: Photos, Sample reports KSC-MSL-2006-0525 And 0549

Mission Name: Discovery

Component: RCC Panel Rib 8

Product: CLV

Severity: SC2

Status: Assigned

Reported by: *[Your Name]*, 53821, ZS5406, *[your email]*, (650)640-5723

Assigned to: Hotblack Desiato, 62003, hdesiato@nasa.gov, (650)640-9342

Notify for approval: Bert Schricker, 1-3153, [Quality Engineer]

Detection Date/Time: 6-8-2007 3:04pm

Detected During: Internal inspection

Lifecycle Phase: Assembly & Integration

Current Date/Time: 6-8-2007 3:10pm

In-flight Anomaly: Yes

Process Escape: No

Problem Description: Internal inspection shows a cracked rib of RCC panel #8. Debris lodged in cracks in RCC panels, identified as cause of crack. Measured at 5.5 inches, linear, direction of growth is away from outboard edge. Crack does not run through the sensor on the rib by .5 inches. Continued branching is likely to occur. RCC material failure. [*add more description here*]

Immediate Response: Tagged rib, did not remove debris.

Previous Occurrence: Yes

Analysis POC: Hotblack Desiato, 62003, hdesiato@nasa.gov, (650)640-9342, Engineer

System: Primary Structure

Subsystem: Heat Shield

Likelihood Score: 4

Investigation Analysis Description: While performing inspection, found crack in rib near T-seal on Panel 8. Debris was lodged in the crack at 1 ¼" and at 3" from the end at the outboard edge. Debris was not removed, for further investigation. **(***This section will be periodically updated to contain the current state of the investigation.)*

Cause Type: Probable

Cause Code: XE

Cause Description: Debris struck the wing in the vicinity of the lower half of the RCC panel 8 while in-flight, exposed to environmental factors. Needs thermal and aerodynamic testing and analysis to further determine RCC failure causes. [*add more description here*]

Problem Type: Hardware

Part Number: 10112-0041-190

Part Name: RCC Panel 8

Disposition Type: Scrap

Serial No.: 20000085

Usage Constraints: See CRR 11-206

Waiver Deviation: No

Remedial Action POC: Alonso Vera, alonso.vera@nasa.gov, (650)-604-6294

Remedial Action / Disposition: ***(****This section will be periodically updated to contain description of resolution to correct the problem in its current occurrence)*

MRB Reqd: No

Signatures and Closure

Assignment: Leave as assigned

Notify for approval: Bert Schricker, 1-3153, [Quality Engineer]

Post-Study Questions

What did you like and not like, or find easy or frustrating to use [device form and screen interface]?

In what ways was this prototype better or worse than your current process?

What info do you have/know? What info can you get from WADs, documents, etc.?

	First test: Engineer in office who read problem reports in the past. (6/26/07)	INTERPRETATIONS
1	Okay so this is the scenario we're working on.	
2	Is this actually what it looks like, carbon carbon piece.	
3	Gotta read it.	
4	Ok so there's this crack that not just me but apparently someone has discovered apparently.	
5	So I'm supposed to fill this out.	
6	**(Tap tap) Hello? (Screen turns on)**	Slight confusion on how to turn on
7	Summary, short sentence.	
8	So I type it in, write it in, what.	
9	**Keyboard with my big fat fingers, eh?**	Small keys
10	**Oh, ASDF. Ok.**	Recognizes QWERTY keyboard
11	So I have to hit the summary field first.	
12	**Can you write it in there or oh it doesn't work.**	Initially tries to use stylus - doesn't work
13	**You can correct the spelling later.**	Indicates a typo
14	(Using one-handed hunt and peck.)	
15	**How do I do the numbers? Shift to get to the numbers? Eh? (Once, twice)**	Shift trouble
16	**(Beep, beep) What does that mean? (Beep) It didn't like it.**	Prototype beeping at user
17	(Using stylus to change entries.)	
18	**Upper. No choice, it just says upper.**	Correct choice missing from drop-down menu
19	Project or name, whatever.	
20	Severity, is it for me to decide?	
21	Reporter name? What is that?	
22	**Enter my email address?**	(This should autofill)
23	**(Beep, beep) Doesn't like that.**	Prototype beeping at user

24	**Period? Where's that?**	Period in inconsistent location on prototype with location on a QWERTY keyboard
25	**And shift? What was that?**	Shift trouble
26	Add CC: - do you want anything in there?	
27	I assume CC is carbon copy.	
28	I have no idea, this is a fantasy game.	
29	Location - maybe I'm playing the wrong game!	
30	Oh, it's a pull-down menu.	
31	DTCT? Detection Date, During? In-flight anomaly yes/no?	
32	**Process Escape, what's that? "Was there a process escape?" Haha. What is that.**	(Need better definition)
33	Boriss: Remember the base station.	
34	**I'd think when you're doing this you'd be at the site.**	Tendency towards all-in-one workflow
36	Boriss: Do you want to synch up?	
37	Okay I guess I should.	
38	**Engineers who do that'll want an automatic spellchecker. Put that down.**	Design suggestion: spell-checking at base station
39	**Then come back [to handheld]. And I assume that's on the device now?**	Workflow inaccurate: freely moving between handheld and base station from same seat
40	Ok it's making a suggestion, how do you accept a suggestion. (Stylus tap)	
41	**I like the idea of suggestions.**	Likes spell-checking suggestions?
42	Crit Code is what?	
43	You don't have a default. Is there a particular code?	
44	**Took pictures. How do I...?**	Momentary confusion?
45	Okay now I synch to the base station.	
46	Then, submitted.	
47	~20 minutes.	Excessive duration

Afterwards:

48 I liked the call-out menus.

It was frustrating when things didn't fit exact
49 descriptions. Experts'd know but I don't.

Functionality good, one flowing direction, not going
50 everywhere.

51 Pull-downs should have an "out" for things that don't fit.

I liked the spelling. Even if it's wrong you can just delete
52 a few letters.

53 We used to get a lot of pictures, really good.

But these days these 10-megapixel cameras are
54 creating terabytes of data. Too large!

55 They also take videos all the time, burnt to DVD.

56 I tend to like toys.

Warning: Considers device a toy, enjoyed extra exploration time.

2	Second test: Technician who makes problem reports in various buildings. (6/26/07)	INTERPRETATIONS
1	**First how do I turn this thing on? Take the stylus to turn this thing on.**	Slight confusion on how to turn on
2	**I like this, it lets you write on the screen (hand recs to gobbledygook) wait it doesn't.**	Initially tries to use stylus - doesn't work
3	I have to text it. Is that correct?	
4	I think your keys are a little bit too close.	
5	Ok, I'm just typing the description.	
6	**Uppercase A?**	Shift trouble
7	**Can I use the scroll key to go up and down?**	No scrolling buttons
8	**How do I go back to see what I wrote? (Writing summary too long for the summary box.)**	No sideways scrolling?
9	I'm looking for the linking, so I'm thinking the barcode is the link to the PR. I'm not sure.	
10	I guess I go to - how do I, do I touch [with the stylus]?	
11	Oh wait, there's a problem number. Has this already been assigned? I believe you do.	
12	**If you don't have the mission name listed can I write it in? It's not letting me do that.**	Cannot type in option missing from menu
13	I'll skip this one to component.	
14	I don't see the marking of severity code.	
15	**Upper? It's not upper, it's lower.**	Option missing from menu
16	**Won't let me write in mission name. That's kind of frustrating.**	Cannot type in option missing from menu
17	**Whatever the mission name, that should be in there.**	Option missing from menu
18	The problem is, I should be able to link to the number here.	
19	**The component, I can't put it in and you won't let me write it in.**	Cannot type in option missing from menu?
20	Status Assigned, Reporter me. CC? You have no CC.	
21	You guys have some great stuff.	
22	Analysis and POC, I'd put in people who do different parts of the structure.	
23	**I don't see thermal protection, leading edge, so I'll put in primary structure.**	Option missing from menu

24	**Subsystem: TPS but it won't let me type anything in.**	Cannot type in option missing from menu
	IAD: crack found. I like that (talking about spelling	
25	autocomplete?)	
26	(Saves after each tab, before moving to next.)	
27	Part number? Ah... skip it.	
28	(Copies part name in from description.)	
	It should come up with the part number if you put in	
29	**the name.**	Part number and names should fill each other
	Assembly, could press on that and get another	
30	**screen to describe that.**	Design suggestion on Assembly field?
	You wouldn't be able to have any of this out in the	
31	**field. (Describing resolution tab)**	Fields unneeded at the site
32	Cause description here'd be debris impact.	
	(Pokes key with stylus first before switching to	
33	**hands.)**	Difficulty in homing between stylus & keypad
34	Corrective Action: replace panel.	
	If you have a base station set up, it should	
	recommend a corrective action with parameters. If	Design suggestion: recommend corrective
35	**it's large, replace it; if it's small, use a TPS repair kit.**	actions
	I'm not sure whether to fix it or not. I assume other	
36	people'd be looking at it within my team.	
	Since I'm looking at it, the team could bring in	
37	specialists.	
	First you talk about it within the team, then you decide	
38	whether to bring in other people or not.	
	It'd be nice to have people on your team in the field for	
39	the CC. Should be other people on your team to know.	
40	**I presume I'm at KSC but I don't see Kennedy here.**	Option missing from menu
	I don't see _____ (lost). I could put in	
41	**Flight/Launch Ops.**	Option missing from menu
42	**"Process Escape" - don't know what that means.**	(Need better definition)
	"Problem Descending" would be for inflight stuff	
43	**(points to Inflight Anomaly).**	Misinterpretation of field name abbreviation?
	(Thinks "Desc." stands for "Descending" because in	
44	**proximity with "Inflight Anomaly")**	Misinterpretation of field name abbreviation?
45	You don't mind me skipping around do you?	
	It would be nice if I could put in the part name from	
	the part number and all the subsystems would show	
46	**up tied to it.**	Part number and names should fill each other

47	Nice toy, it would be very helpful.	Warning: Considers device a toy, enjoyed extra exploration time.
48	**(Indicating "Cost" field) You never worry about cost in the field.**	Field unneeded at the site
49	Maybe closeout summary. I'd fill it out some, then have another person there to check my work.	
50	Always want second set of eyes on a critical task. I would never close it.	
51	Have another person to do it. Also take a picture before and after repair.	
52	(Taking a picture) I would point and hit with stylus HERE. (Jabs button on interface)	
53	I'd save this to library so I can talk to other teams and see what they did.	
54	I'd expect to save to my personal library, and on a server related to that part.	
55	**Jack: When you saved to the library, did you save the whole report? "I hope I did!"**	Mistook attachments screen for entire report?
56	Submitted picture with report.	
57	~25 minutes.	Excessive duration
	Afterwards:	
58	My complaints are that I can't write in the fields. Also I want a library of autofills, and a library of ways to fix it.	
59	I like touchscreens but don't like to use graffiti or have to learn things.	
60	I like an on-screen keyboard on my PDA.	
61	You could just use fingers, but that would be hard with gloves.	
62	These buttons are small. You could possibly hit two at once, but I didn't. I guess I was paying attention.	Interprets buttons as too small; doesn't report and problems himself.
63	I'd like to go into this area and see the history of an area, and if prone to cracking, are there any parts I can use to repair it around.	
64	I don't think I need a base station. Only to access history not available on the handheld.	Tendency towards all-in-one workflow
65	This screen is pretty crisp. The Treo screen is much harder to read.	

3	Third Test: Test engineer at the arcject complex (6/28/07)	INTERPRETATIONS
1	K: So you're a field engineer?	
2	F: I'm a test engineer for the arcJets	
3	Picture mail? I use attachment mail...What's T9?	
4	High voltage high current, electromagnetic interference, noise,	
5	etc.. (muttering while looking at last question)	
6	K: Here's a task script. We want you to follow this set of	
7	taks, read this scenario, create a new report, take a picture,	
8	and synch with the computer workstation.	
9	F: (Immediately recognized picture as an RCC on the	
10	spaceshuttle) I tested the <something> on those.	
11	K: So you've reported problems on these?	
12	F: No. After the Columbia incident people realized we needed	
13	onboard repair kits for these things. I ran tests on the repair	
14	kits for these. I ran a few hours of these tests.	
15	K: So no you can follow these tasks, make sure you follow these	
16	tasks and think aloud.	
17	F: First of all, how do I turn this on? No turn it on switch.	Need another method of returning from screensaver mode (touch
18	The screen is dark, and I can't see a background lighting switch.	
19	I've never seen this, I have to play with it to see...is it a touchscreen? Yes...Oh there's a stylus. <tapped something>	Wants to use fingers instead of stylus to click
20	well	
21	that didn't work. Am I pretending that this is something that I	
22	already have or something new?	
23	K: We want to capture what a new user is like, too.	
24	F: Pictures and video...ok that just displays what I can capture.	Camera functionality hard to find / use

25	<looked around for a hard button of some sort>. Does it really	
26	have a camera? I'm looking for the camera function to take	
27	pictures, that's what I was going to do first. I guess this is	
28	the reporting form, previously set up.	
29	K: If you have trouble understanding what the forms mean you can	
30	refer to this.	
31	F: <entering, 2 thumbs> cracks found in panel 8...that's what	
32	it says, panel 8. shift....ok there we go.Ok...linking it to	
33	ID...I guess this is the ID <pointing to part #>. I'm typing STS	Mistake barcode for problem id
34	114 in here, it's the mission name, I can't figure out how to	wants to type in because no option in list, but only drop down selection
35		Need to be able to edit and type into any field
36	type it in. It has a preloaded one, but that's not the one I	
37	want. Lower half, ok I don't see Lower, just upper...you can't	
38	type anything...I can't put it in here. Severity...<looking	
39	around page> Standards...stage...	
40	R: What are you working on?	
41	F: I'm on the reporter that's putting my email address.	Can't edit Assigned
42	Whatever that is...<reading to himself	
43	incomprehensibly>..copy....there's no copy....where's	Copy and paste
44	copy...whoops...<chuckles, clearly	
45	a little frustrated>. I'm looking for the "at" logo for	
46	email...jeez, you can't see anything. How do people type these	keyboard labels hard to identify, too small / cluttered
47	I'm just not familiar with these at all? Lifecycle phase, what's	
48	that....resolution? Inflight....I guess it is then...process	
49	escape? No then? or is that yes? Panel of the left wing,	
50	better put that down under summary. 5.5....oh, what? <now	

roughly 17 mins in>.

K: you can use the function key

F: ok...5.5 inches. no semi colon...jeez...ok i'll just use a <something>. ...2.5 inches...3 inches....<long period of silence>. crack...does not...ok i guess i'll move on to the next item. Immediate response <reading to self>. <now 20 mins in, still on basic tab>.

Don't know what to type into summary field, should specify example or

K: what are you typing...you can tap it in

F: ok let's see if that works. fault tree...now the previous recurrence, does it refer specifically to that, or to the orbiter in general?

K: to the orbiter in general

F: additional comments...mission name.. can't type it in. i don't know what the severity is...is there a discussion of what the severity is? cc people no i can't do that. edit more details, occurrence, locations. <almost 30 mins in, still on basic info>. do we have to go through these sections? analysis, resolutions? all this? <he doesn't seem to have any inkling to use the base station for anything>. you can't type in a name. system? where's system? <constantly refers to glossary packet>.

Structure, structure, where's the structure? i'll put that under subsystem...can i type it in? am i supposed to do analysis on this?

Can't find structure in drop down list, even though "primary structure"

K: you can probably just submit it. the idea is that this would be sent to an engineer.

F: oh, i see, i assume the synch already works. oh...what did i

77	do? <accidentally hit the phone button, then turned it off>.	
78	anything else? i need to synch, so i need to go...<looking for a	
79	way to synch ostensibly>.	
80	K: what are your general impressions of this?	
81	F: well i've never touched anything like it, it's like i can't	
82	get anything done. in the field i'm assuming you wouldn't just	
83	throw this at someone who's never used it before. i've never	Needs training
84	used this keyboard, it's not very ergonomically friendly and kind	
85	of awkward. the software features, like what it prompts you to	
86	enter, it would be nice to autocomplete without having to use the	Easier way to select autocomplete rather than using stylus to tap
87	stylus to pop up and complete it. i'd prefer to be able to use	
88	my thumb over the stylus. i don't mind if it's heavy but this is	Heavy and bulky
89	very heavy.	
90	K: is that device something you use on the job?"	
91	F: yes, it has a scientific calculator with reverse polish. i	Needs calculator
92	use it all the time. i use it for contacts.	
93	K; do you ever load anything onto it or refer to other documents?	
94	F: If I do testing down at the arcjets, i have a laptop with me,	Personal device
95	we do have wifi here, so i tried it when i first got it, but it's	
96	kind of awkward and not as friendly as what you're familiar with	
97	on the laptop. I can write graffitti really fast because i'm	Experienced in graffiti
98	familiar with it. the keyboard would have to have a better feel,	
99	i'm not used to it it's really awkward to use.	
100	K: do you communicate using the pda at all?	No wifi / internet / communication currently through his device (difficult)
101	F: no, the only communication i use it with is synching with my	
102	desktop.	

103 R: did you think about the desktop at all?

104 F: i assumed the task was for the device. you might not be able — Use of base station depends on task and location

105 to bring your laptop if you were crawling around on the orbiter.

106 R: what if you were crawling around on the orbiter?

107 F: obviously i would try to enter as much as i possibly can on

108 the device. my palm has a microphone, it would be MUCH more

109 efficient if i could use voice recognition and mention it and — Prefer voice recognition instead of filling it in (typing?)

110 have it filled in. that would be the next step in technology.

111 they'd be getting smudges on the touchscreen if they got stuff on — Touchscreen wouldn't work in certain tasks bc dirt, smudges

112 their hands from the orbiter.

113 K: would you like to have other documents come up?

114 F: that would be nice, bc when you're crawling around in there,

115 you'd want the prints while you're there. i've never actually

116 crawled into the shuttle, but i DO know what this part is

117 supposed to look like.

118 K: what do you think about the screen size? — Good screen size

119 F: THe screen size is fine, it's a little heavy and bulky

120 compared to what i'm used to.

121 K: what do you think about the palm?

122 F: again, i'm not familiar with the keyboard, i'm squinting

123 looking for the commas and periods, once you get familiar i'm

124 sure you can work around, i've seen people type really fast with — Big fingers, since not trained don't know if he would use it

125 these.

126 <DIdn't like the weight of >

127 I think if the voice recognition software can get to that

128 point...i mean...you can say "dial home."

Afterwards:

129	We should get feedback on the surveys...	Should be able to see problem definition when tap on label
130	There's no incentive to use the base station.	
131	There should be some element of training.	
132	He seems to sort of be filling it in without any real	
133	understanding of what's going on (Chinese room).	
134	Seemed to dislike it more as task progressed.	
135	we need a way of saving PRs they do so we can analyze them later.	
136	we should add contact info to the surveys...	
137	Also he's saying a lot under his breath that I can't understand.	

Operation Readiness Testing

Detailed transcripts of the 1st and 2nd ORTs were not taken. However, results from notes were analyzed and ultimately worked into the appropriate sections of the main paper, for both first (40) and second (43) ORT. Beyond these notes, some 2nd ORT insights were important enough to record, but not enough to merit inclusion in the main paper.

First, one of the aviation technicians-in-training suggested the use of a camera lens on an extendable, wired probe that could be angled in positions independent of the main body of the handheld. This design insight was noted early in the project, but was abandoned.

Second, the most senior and respected of the aviation technicians in the AMTS, as well as the manager of an entire aviation shop, reacted to the prototype with total disinterest. He politely declined to make an effort to only even touch the keypad. He clearly saw no value in the device, yet he would be a major beneficiary of speedy electronic problem reporting within the context of general aviation, in which all discrepancies must be logged for billing purposes and FAA paperwork.

This silence was ominous, and one his students took me aside afterwards and explained that the handheld, at least as currently designed, would never voluntarily be used by aviation technicians. “Technicians think with their hands.” They would not appreciate having them occupied by a handheld such as this. He suggested auto-complete combined with a voice recording solution instead, and left.

NASA has the authority to demand its technicians use a device if it will benefit others in the larger organization, and reactions of tested NASA users were generally positive, so this incident was dismissed as not relevant to our user base. Still, this observation is significant, and so it has been logged here for future reflection.