

STARFARE VOICE INTERFACE

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NCC-1701

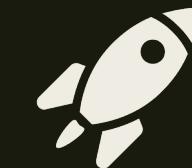


STARFARE

innovative flight command interfaces for new
age space flight

physical interface challenges

GOAL



deploy a command interface
that relies primarily on voice
command, bypassing physical
console interaction in order to
improve efficiency and
increase usability.

SOURCES



existing technical data from star trek

alexa, cortana, google assistant

user interviews regarding voice interface technologies

NavAssist

RESEARCH i

accents, regional dialects, and other voice irregularities

lack of accurate voice interpretation

simplicity and ease of use
navigation technologies



USER INTERVIEWS

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hesitancy & lack of trust

poor experiences with existing voice command technology

proof of command interpretation accuracy

manual interaction
correction options

USER NEEDS



accuracy

trust in interactions

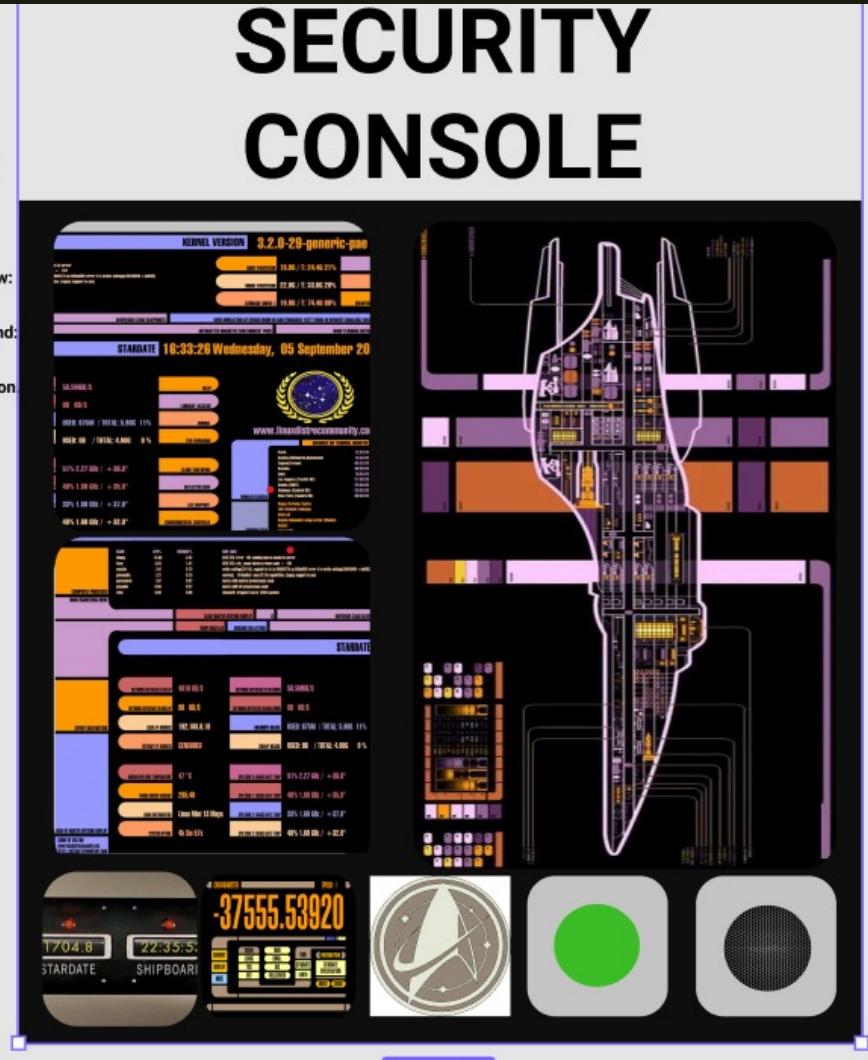
simplicity

INITIAL PROTOTYPE: RED ALERT



Activating Red Alert

- When the user wants to activate Red Alert, the steps are as follows below:
 - User speaks the voice command: "Computer, activate Red Alert."
 - The Computer then begins Red Alert activation



INITIAL PROTOTYPE: COMMUNICATION



SECURITY CONSOLE

Sending an Outgoing Message

- User will first speak a command to signal intent to send a message:
"Computer, send a message to (name of intended vessel)."
- The interface will then confirm the message destination.
User will respond yes or no.
- The computer will then prompt the user to speak their message.
As the user recites their message, the computer will display the recorded message on the computer screen.
 - User states "Message concluded." To signify that their message is complete.



INITIAL PROTOTYPE: EXTERIOR/ INTERIOR SCAN



SECURITY CONSOLE

Performing an Exterior Scan for Anomalies
With Sample Dialogue With Experienced User:

- In order to initiate an exterior scan, user will speak the command: "Computer, initiate exterior scan."
- If the computer does not recognize the users voice, it will ask the user for there name and will enter into the new user mode, adjusting voice prompts to be more descriptive to ensure the user can navigate the interface more easily.
- If the computer matches the voice to an exisiting user in its database, it will enter into the voice prompt routine according to the users experience level.
 - Computer will verbally confirm it is initiating an exterior scan and the display screen will switch to its scanning mode.
- Computer asks for criteria from user for scan (distance, wavelength, etc.)
 - and user will specify what metrics they want the scan to include.
 - Computer begins scan for anomalies (Biosigns, transmissions, etc.)



CULTURAL
PROPS

DEVELOP
PERSONAS

CARD
Sorting

CUSTOMER
INTERVIEWS

USABILITY TESTING OF INITIAL PROTOTYPE



Two subjects

Timed interactions and recorded data

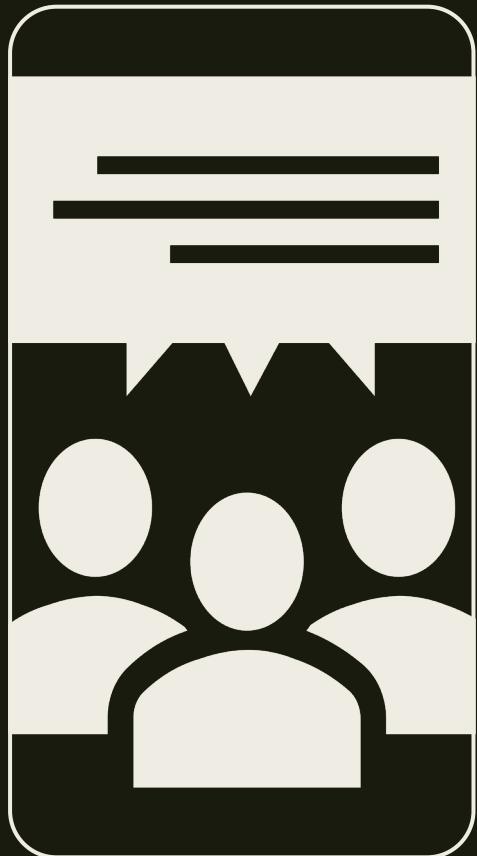
Three initial tasks

1. initiate red alert
2. send an outgoing message
3. perform an exterior scan

FIELD
SESSIONS
RUN A
USABILITY
TEST

USER
SURVEY





Post-Usability Test Interview:

1. is there anything that could be added to provide greater assurance in the accuracy and completion of the computer's execution of the given command?
2. without prior experience using voice interfaces, are there any steps that you would have found difficult to understand, execute, or unable to use and if so, what knowledge do you have that has assisted you in easily the interface?
3. what might this voice interface be the most useful for as a crewman? would it also be useful in similar ways as a passenger, or would it differ and how? is there anything that you find unnecessary, or unhelpful to crewman or passengers?

RESULTS

1

initiating red
alert:

- user a: 25.36 sec
- user b: 29.54 sec

2

sending a
message:

- user a: 47.26 sec
- user b: 59.13 sec

3

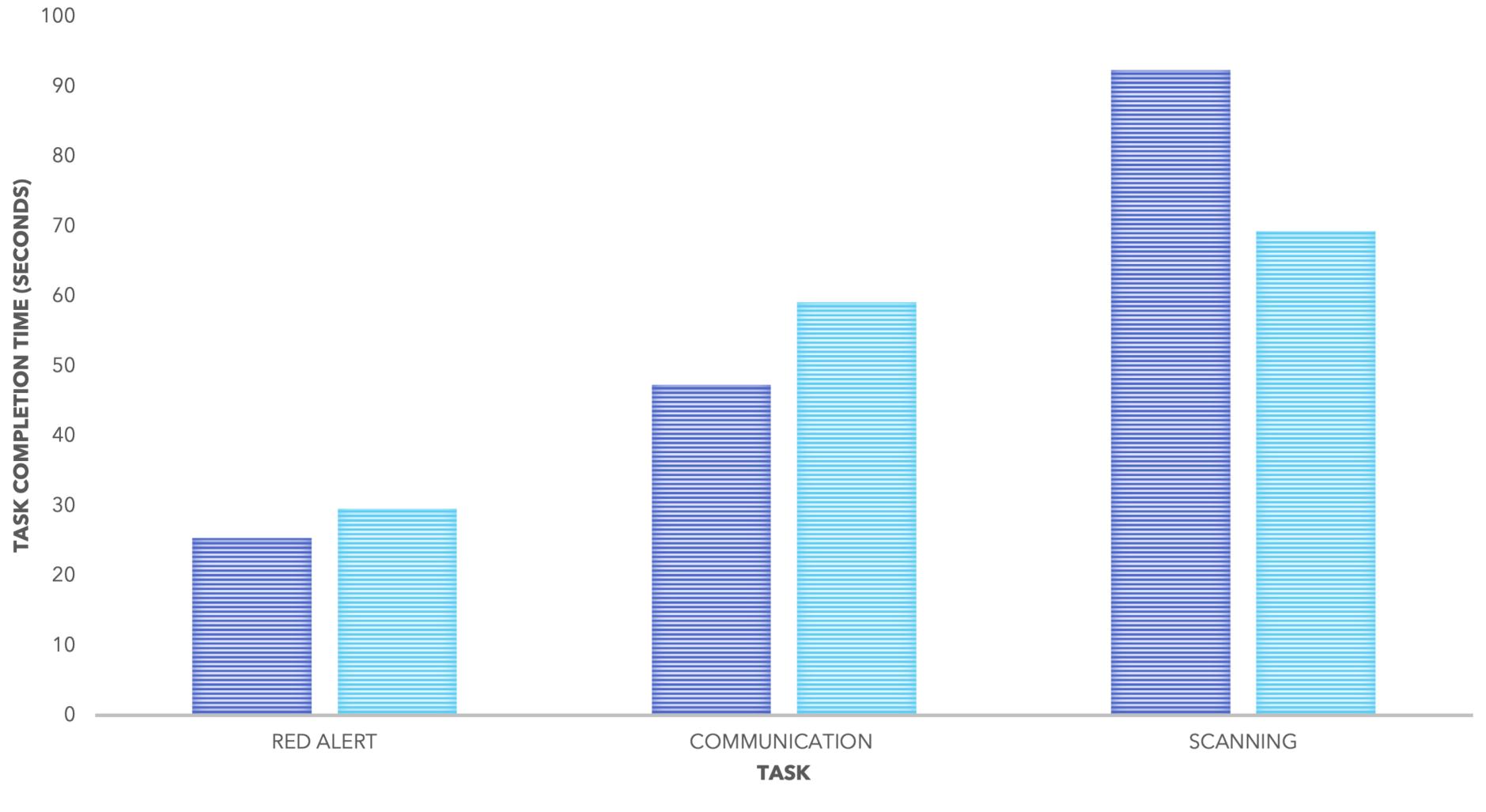
performing
exterior scan:

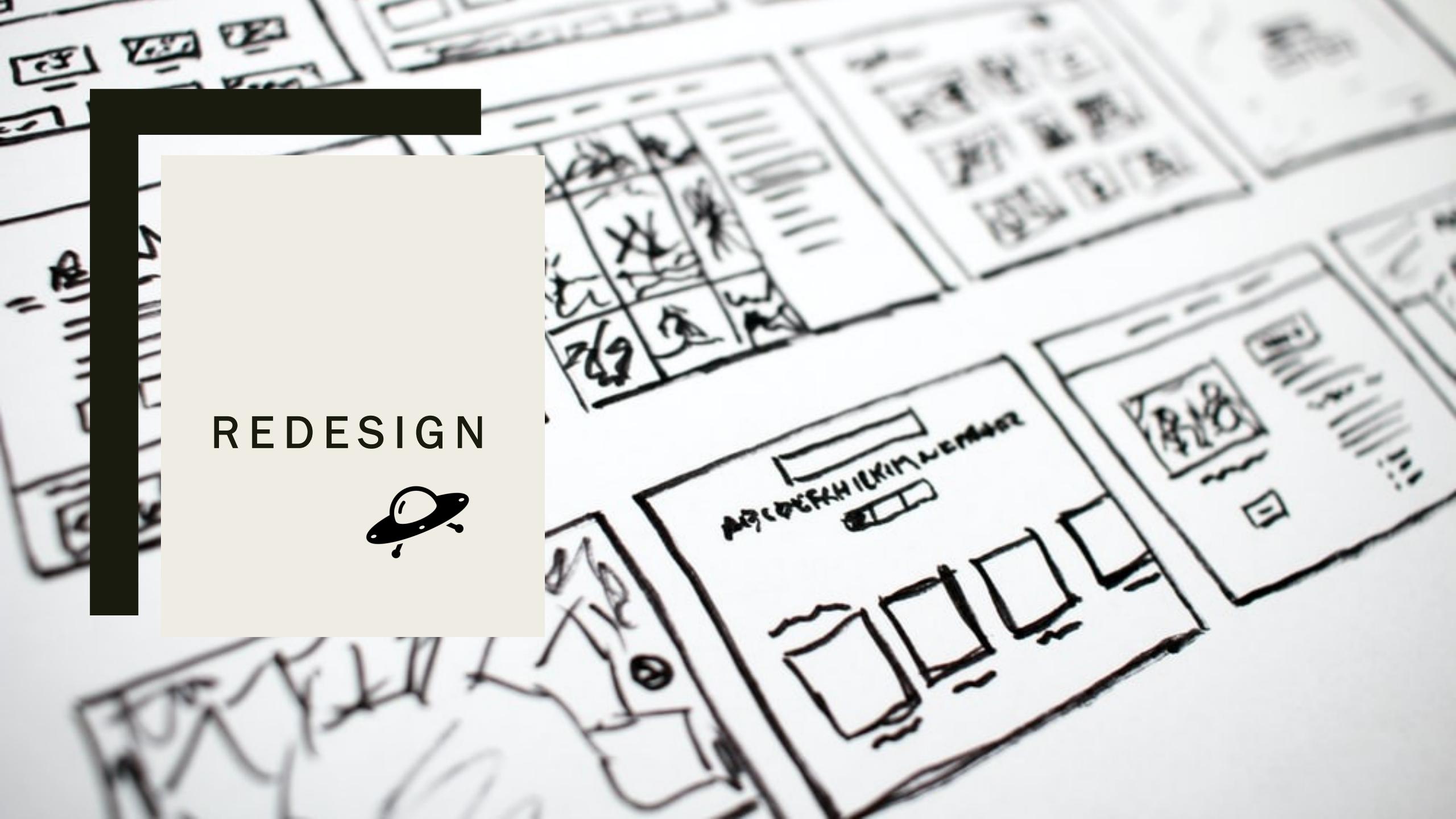
- user a: 92.32 sec
- user b: 69.27 sec

TASK COMPLETION

USABILITY TESTING

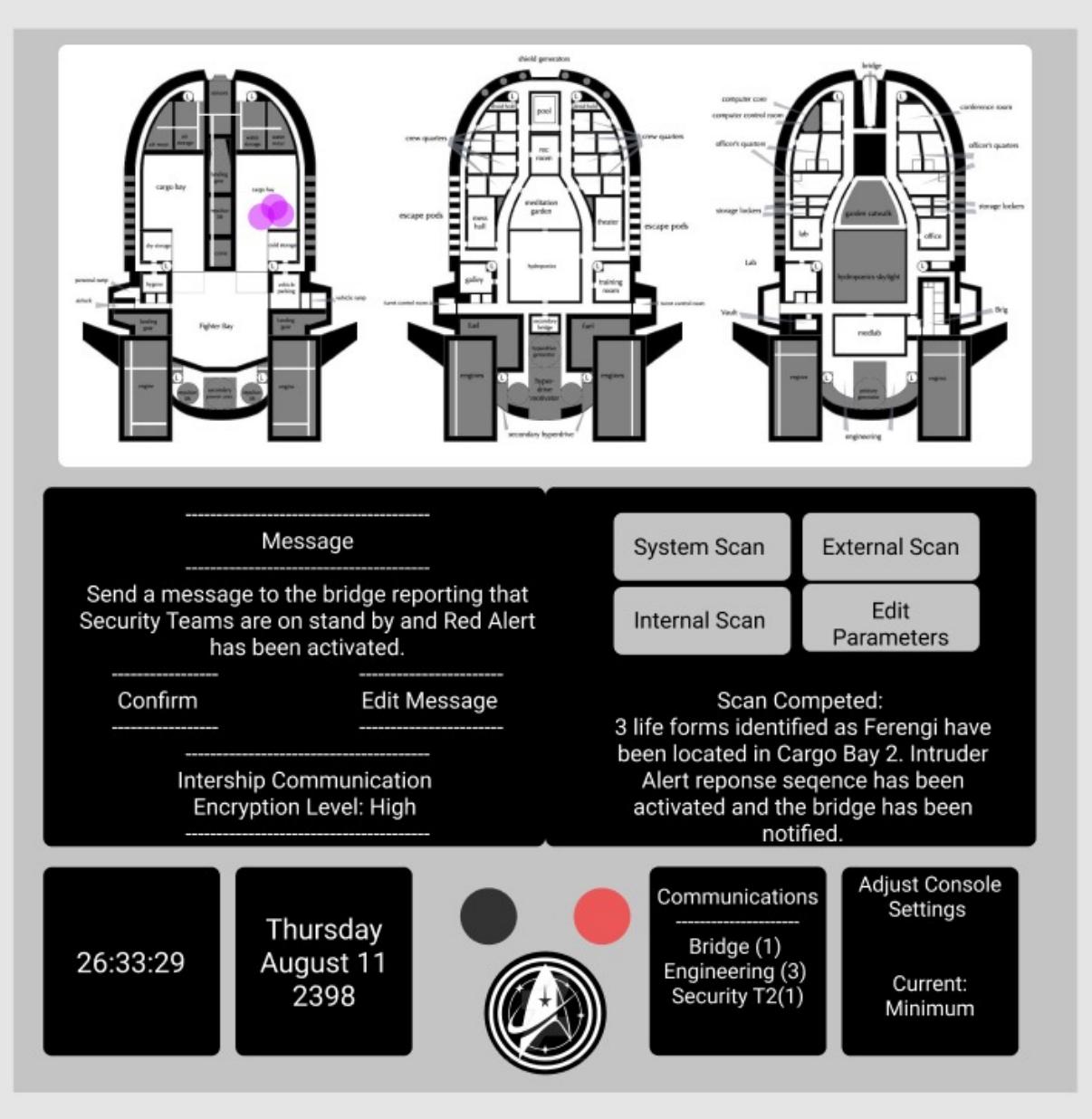
■ A ■ B





REDESIGN





Task A: Red Alert Activation

User: "Computer, please begin voice interaction sequence with response setting medium."



Computer: "Hello Commander Dotsey, please begin."

Dotsey: "Send a message to the bridge reporting that Security Teams are on stand-by, and Red Alert has been activated."



Computer: "Confirm message on screen."

Dotsey: "Confirmed"

chime Computer: "Message Sent"

chime Computer: "Message Received"



Dotsey: "Computer, reduce voice interaction sequence to minimum"

Computer: "Initiated."

Dotsey: "Computer initiate internal and external system scans."

chime to indicate initiation of scan

Computer: "Scan Completed."

Task B: Internal Communication

User: "Computer, please begin voice interaction sequence with response setting maximum."

Computer: "Hello Commander Sengupta, please begin by stating a command."

Sengupta: "Computer, Activate Red Alert. Voice authorization Commander Pourna Sengupta."

Computer: "Red Alert Sequence initiated; voice command authorization confirmed."

Computer: "The ship's status has now been changed to Red Alert. All ship's crew and personnel have been notified. All exterior doors are sealed and locked with command level authorization. Consoles and all other ship systems have also been switched to Red Alert mode. Security scans have been initiated for internal and external scans. A systems security report has also been initiated and you will be alerted upon completion. Are there any other actions in need of execution at this time Commander?"

Sengupta: "That is all, Computer. Stand-by for further command."



Task C: Internal Intruder Scan



User: "Computer, please begin voice interaction sequence with response setting minimum."



Computer: "Identity confirmed: Ensign Mac"



Mac: "Computer, Activate Red Alert. Voice authorization Ensign Mac."

Computer: "Red Alert Sequence initiated; voice command authorization confirmed."

Computer: "The ship's status has now been changed to Red Alert. Red Alert sequence completed. Standing by for further instruction."

Mac: "That is all, Computer. Stand-by for further command."

RESULTS

01

maximum

- user a: 29.08 sec
- user b: 26.34 sec

02

medium

- user a: 24.28 sec
- user b: 19.65 sec

03

minimum

- user a: 14.54 sec
- user b: 12.22 sec



user and computer interaction testing

console settings: maximum, medium, minimum

no communication vs. full communication

most interactions can be done through console

voice authentication conducted automatically

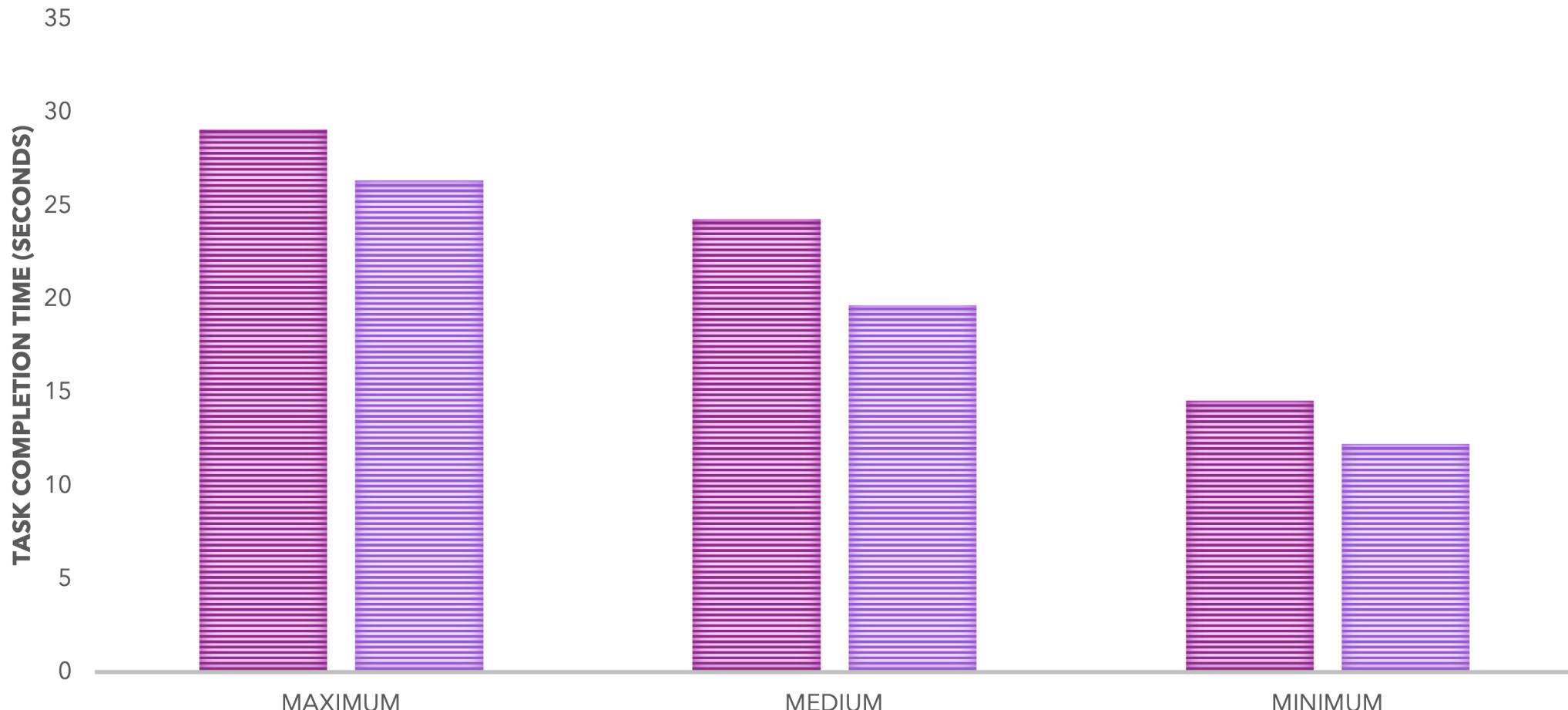
usability testing

minimum console interaction resulted in most efficient task completion and reduced time to completion.

captain uses the minimum setting for efficiency and security

CONSOLE SETTINGS USABILITY TESTING

■ A ■ B





REFLECTIONS