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& G-SyNC Team**

**Spring 2011**

**G-SyNC**

**Ground System for Next Gen Communications**

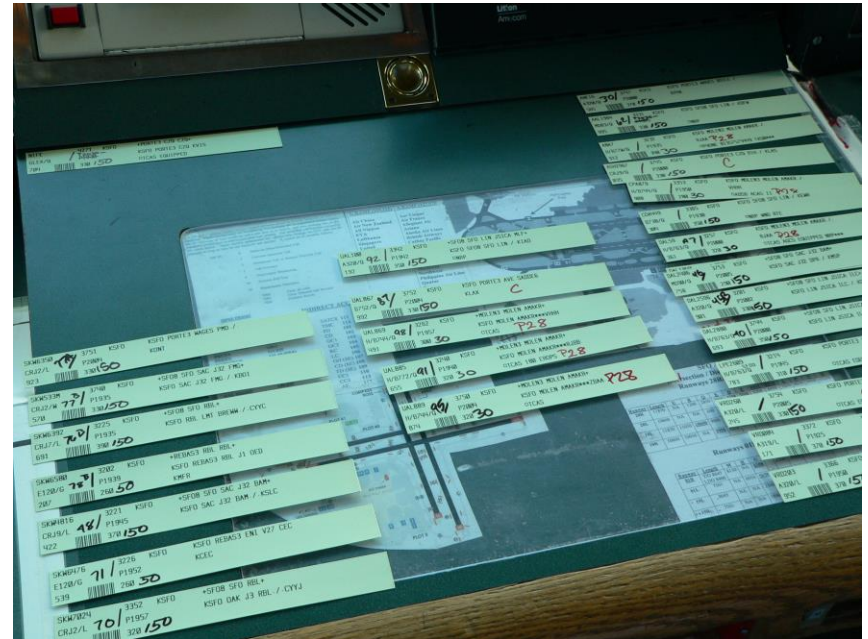


# Current System

## ASDE-3



## Flight Progress Strips



# Needs

- **Improve situational awareness and reduce cognitive load of ATCs and pilots**
  - **Improve runway safety and prevent incursions**
- **Not detract from the safety or meaning ATCs and pilots take from their work**

# Concepts & Selection

- **Live overhead map**
- **Categorization of flight commands**
- **Touchscreen vs. Tangible UI**
  - **Wheels, knobs, buttons, levers**
- **Augmented Reality**
- **Voice Commands (like GPS)**

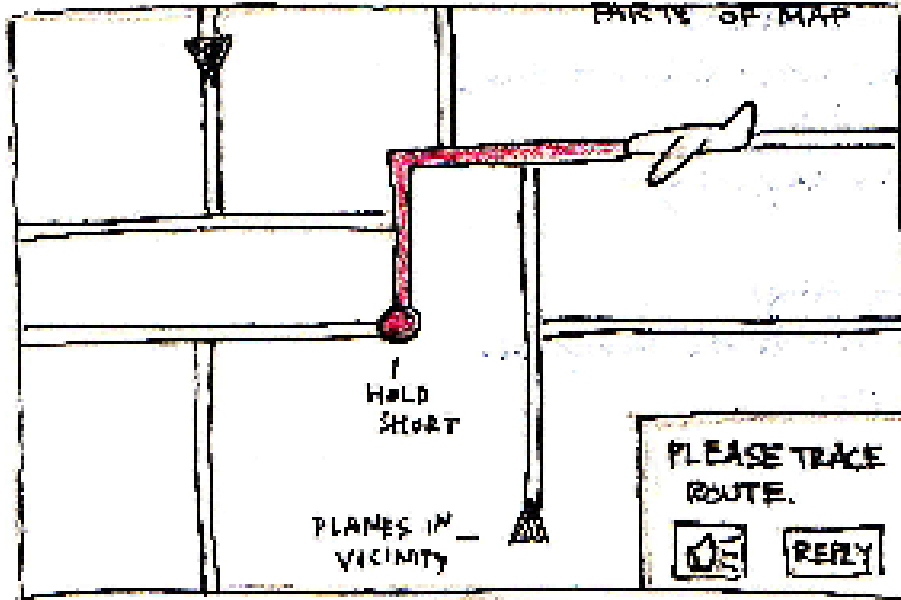
# Original Concept Sketches

G-SYNC

2-25-11

PILOT VI OVERHEAD MAP

CLOSE-UP OF RELEVANT PARTS OF MAP

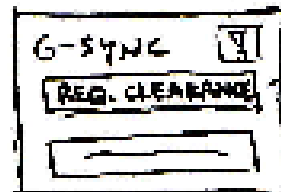


AUDIO: (NOT OVER RADIO)  
\* DING \*

- SWIPEBACK CONFIRMATION - NAME  
AIRCRAFT TYPE  
SEPARATE PLANES, HOW TO IDENTIFY
- \* DISTINGUISHING B/W
  - PLANES OFF-ROUTE
  - PLANES NEED NEW COMMAND
  - PLANES ON ROUTE
- \* TAKE-OFF CLEARANCES → RADIO

DROP-DOWN BOX:  
NOT OVERWHELMING  
WHAT INFORMATION?  
TOO SLOW?

\* COLORS



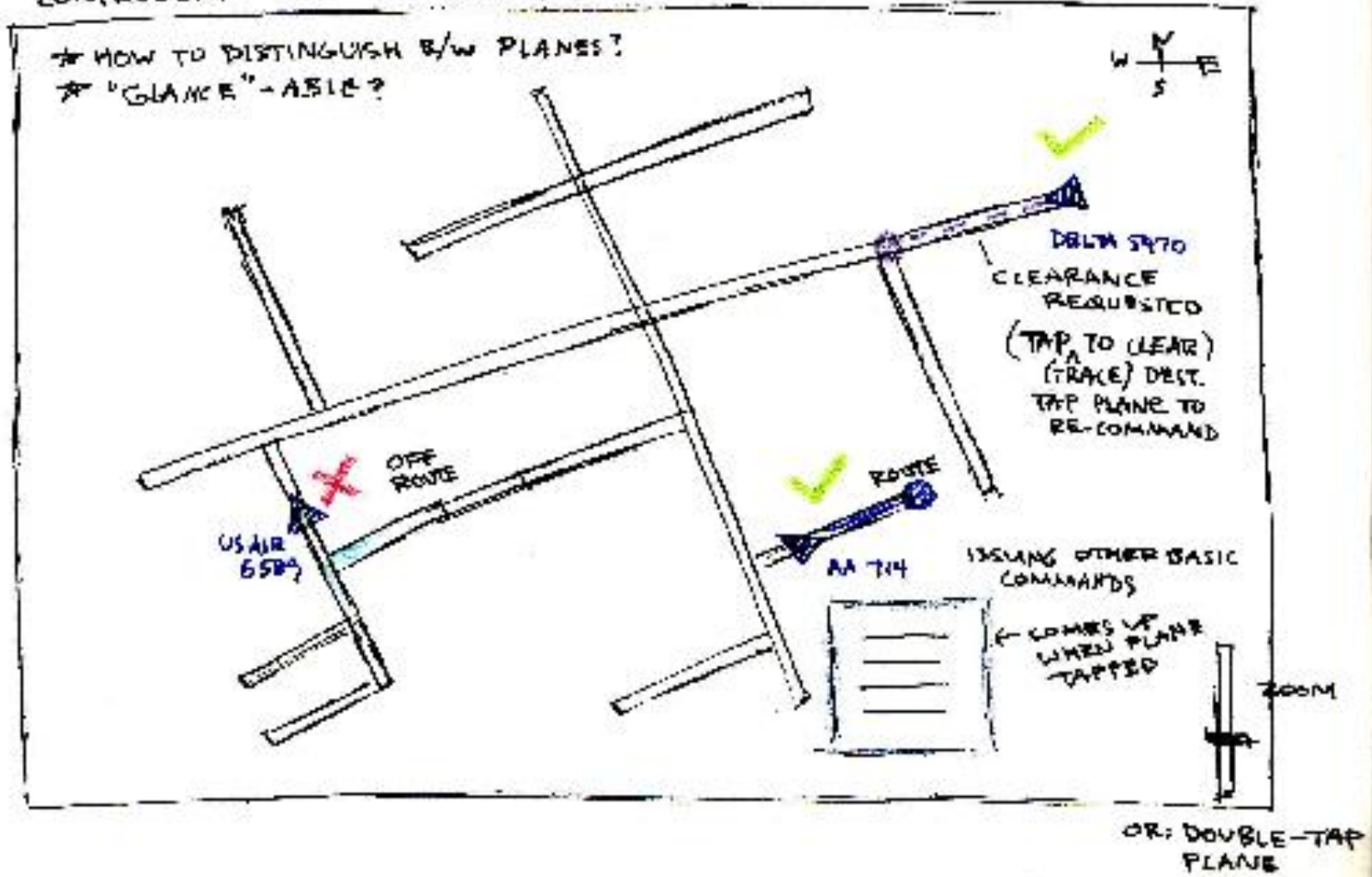
NEED MORE DETAILS ON  
WHAT IS NEEDED TO REQUEST  
CLEARANCE

\* TOUCH REQ. GATE/DESI.

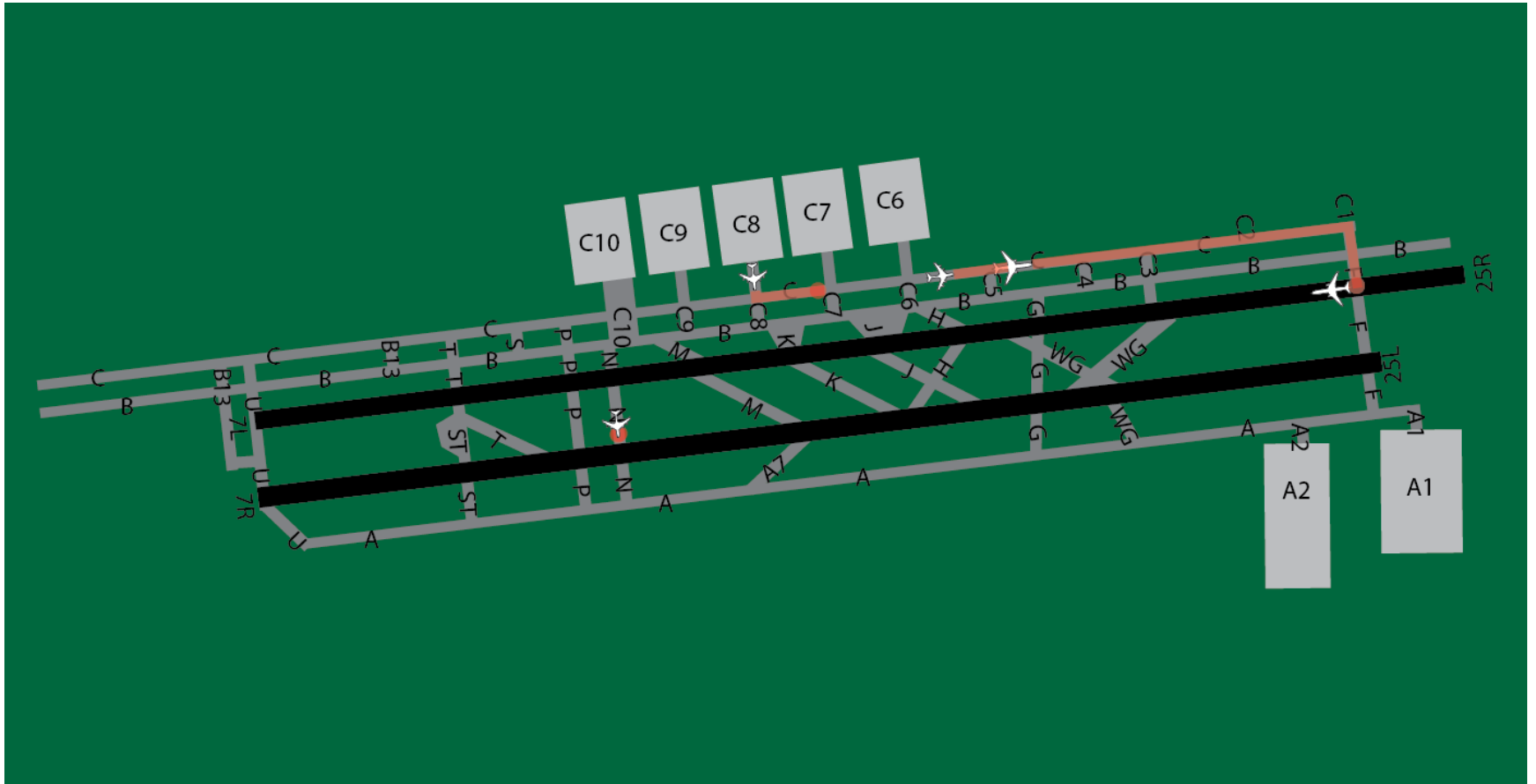
# Original Concept Sketches

CONTROLLER-UI OVERHEAD MAP

\* HOW TO DISTINGUISH B/W PLANES?  
\* "GLANCE"-ABLE?



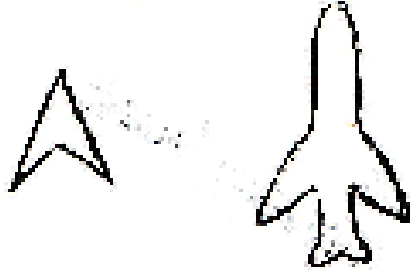
# Original Mock-Up



# Details & Interaction

6-SYNC VI DETAILS

DIFFERENTIATION



ADE-X OUTLINES

SMALL  
LARGE  
HEAVY  
SUPER-HEAVY



DIFF. SIZES?  
COLORS?

outbound

inbound

DISPLAYING CALLSIGNS

NISSEA

NISSEA

w/outline like  
Google Maps

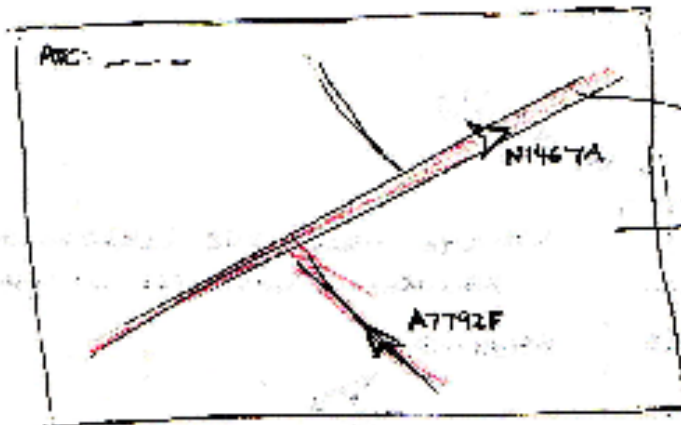
- ONLY SHOW FOR MOVING PLANES?

3-18-11

BRIGHTNESS,  
CONTRAST, HUE



# AREA OF RESPONSIBILITY



ZOOM-IN

ZOOM-OUT

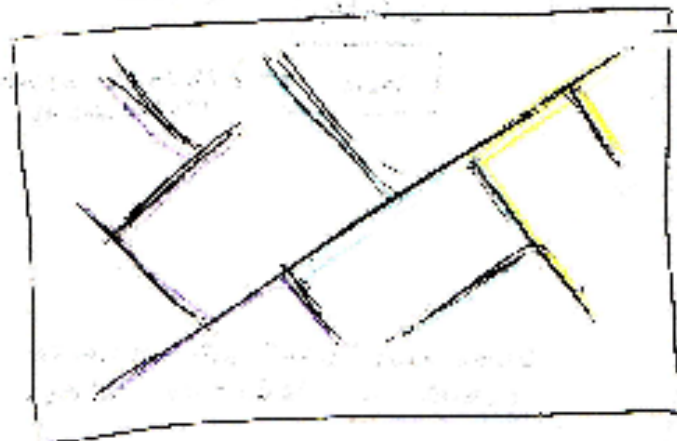
LIKE ON IPHONE



RED/MAGENTA - PLANE MOVING ON RUNWAY

ZOOMED-IN VIEW OF JUST AREA OF RESPONSIBILITY

ROTATE

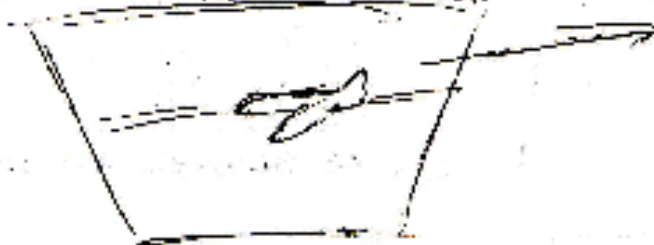


ON ZOOMED-OUT VIEW

→ COLOR-CODED? NOT TOO MANY

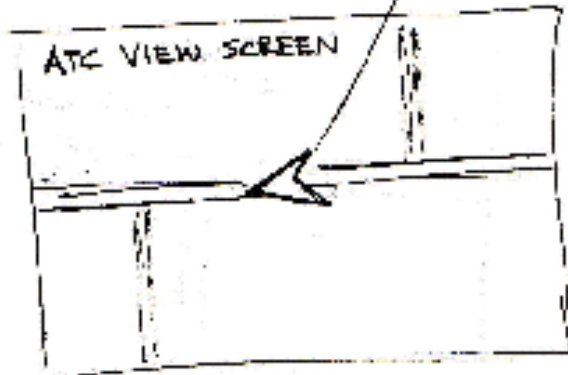
→ OR JUST HIGHLIGHT PERTINENT INFO TO 1 ATC USING SCREEN

VIEW FROM TOWER



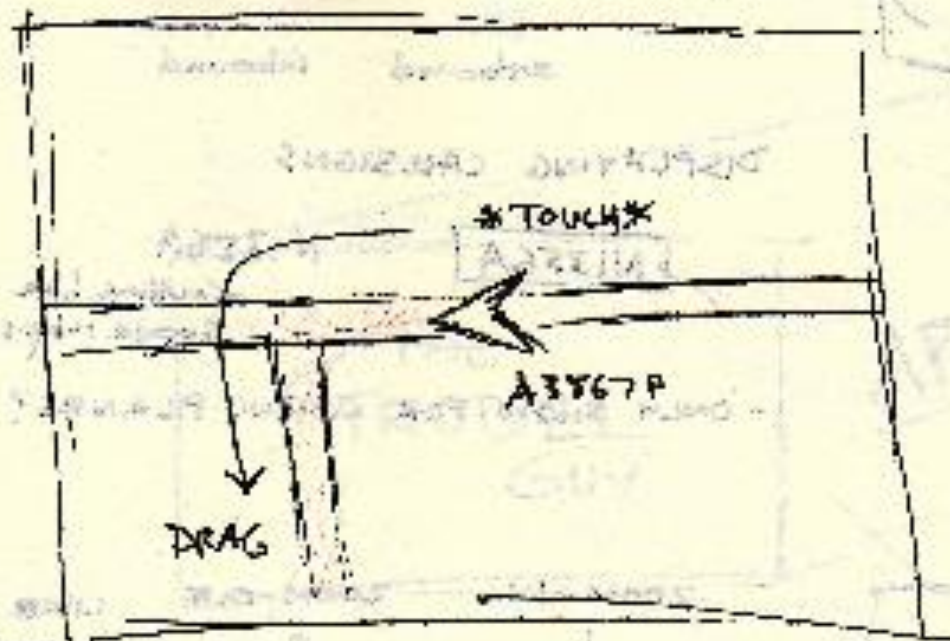
CORRELATE PLANES

ATC VIEW SCREEN



COMMUNICATIONS

→ ROUTE DIRECTIONS



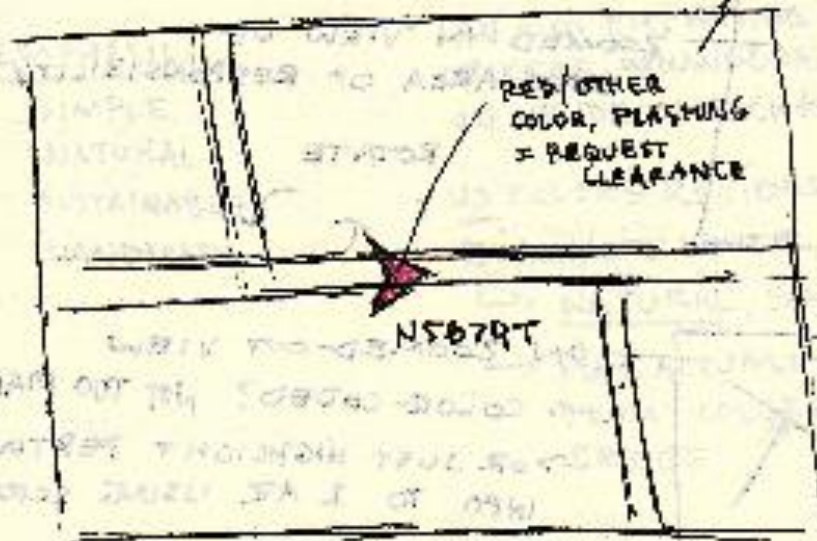
BLINKING  
⇒ EMERGENCY / URGENT

APPLE

AREA OF RESPONSIBILITY

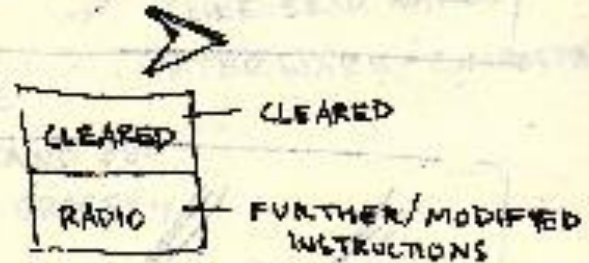
(?)

→ CLEARANCES

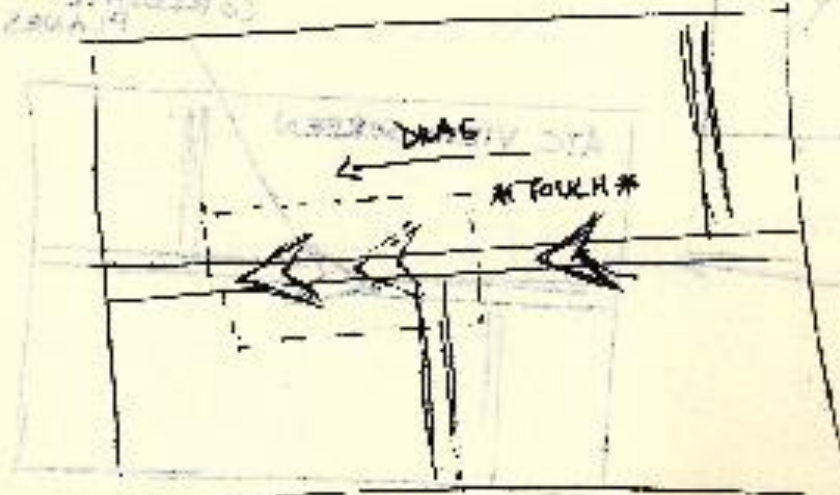


SYMBOL?

\*TOUCH\* ONCE - SEE CLEARANCE REQUEST HIGHLIGHTED ON MAP \*AGAIN\* :



→ FOLLOW



DRAG INTO "BOX" OF DESIRED PLANE TO FOLLOW, APPEARS

AS



CAN BE DRAGGED OUT SIMILARLY

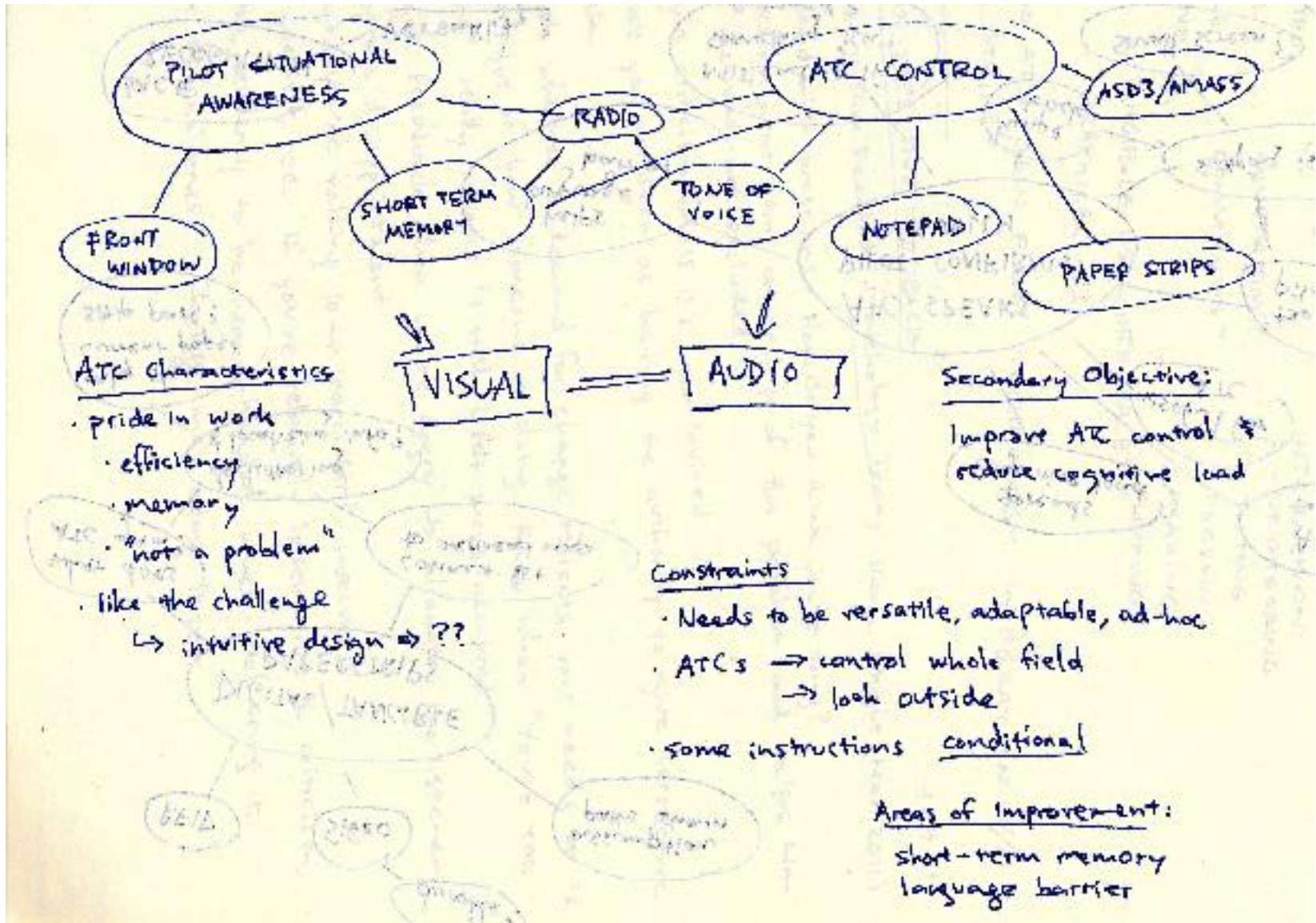
# Benchmarking–NASA

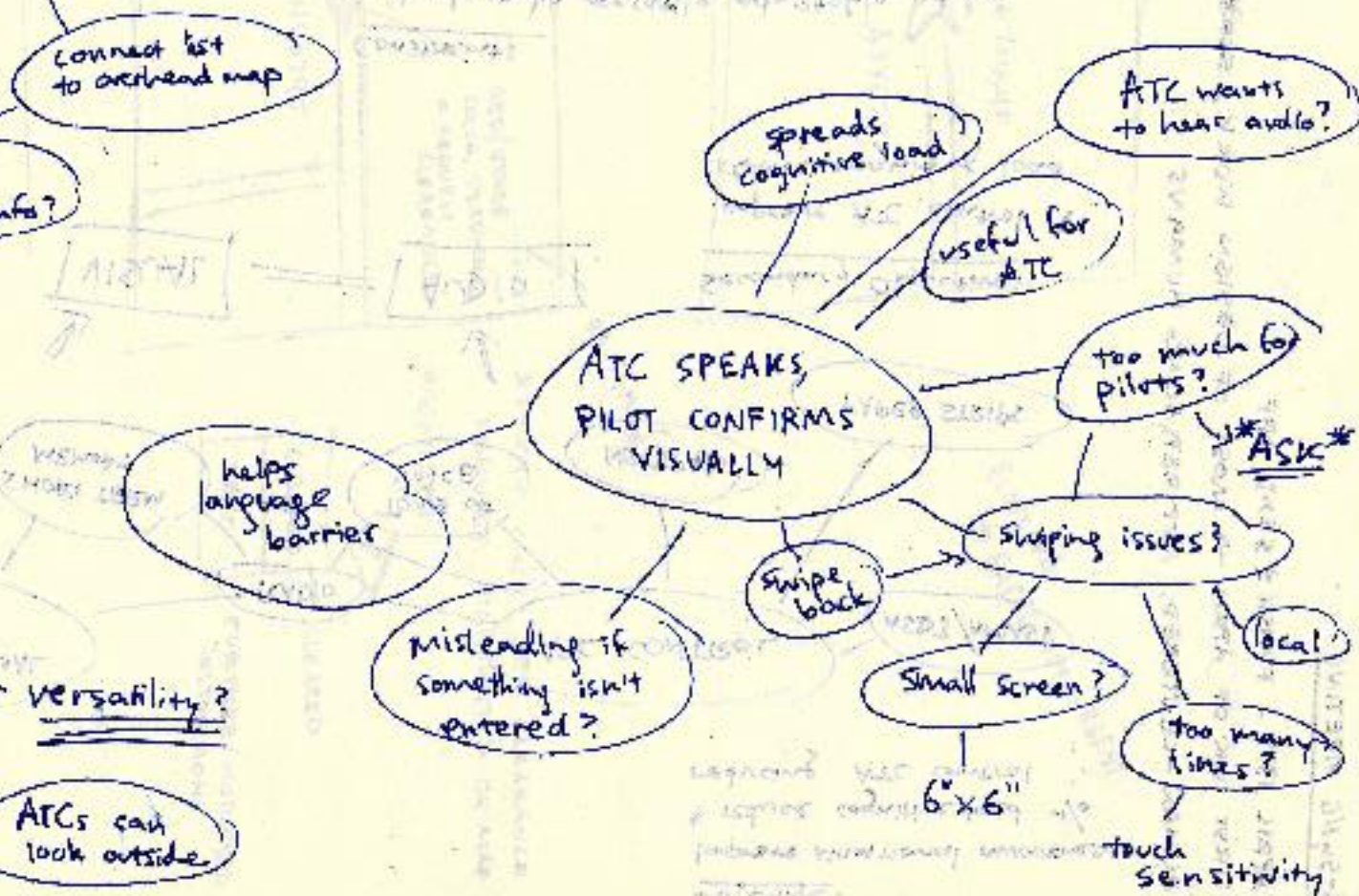
- **Overhead map**
  - Tags for moving planes
  - Pink/blue for inbound/outbound planes
  - Use of color?
  - T-NASA
- **ATC complaints**
  - Angle control
  - Too far/high/low => poor visibility

# Testing & Responses

- **ATCs:**
  - Voice to voice communication is imperative (ad hoc)
  - Users will end up looking down too much
  - Paper strips are all they need (or want)
- **Pilots:**
  - Can't enter information on a touch screen
  - Wouldn't use it unless they needed it
  - Initial planning, bonding, time to enter info

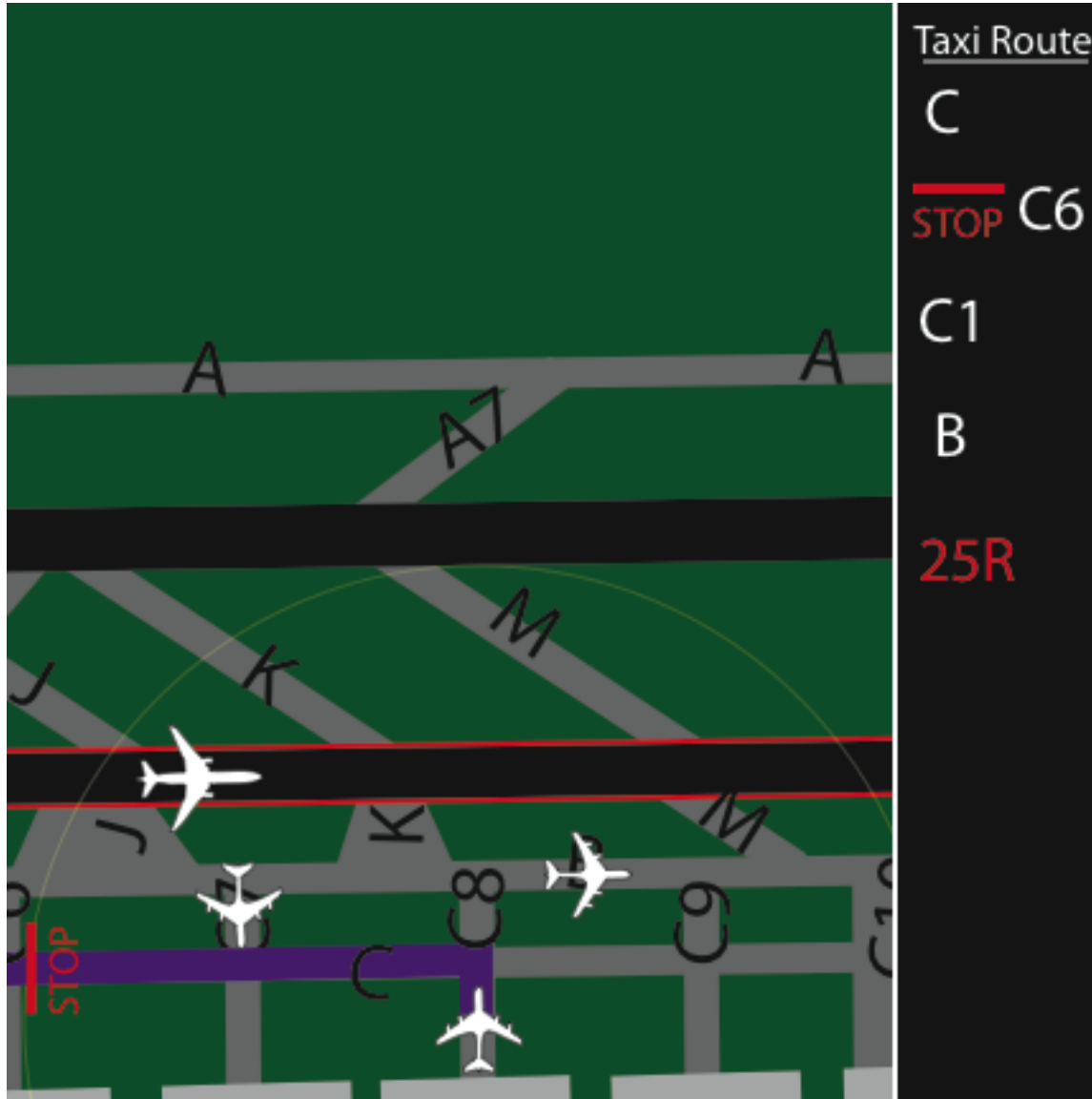
# Concept Redesign





versatility?

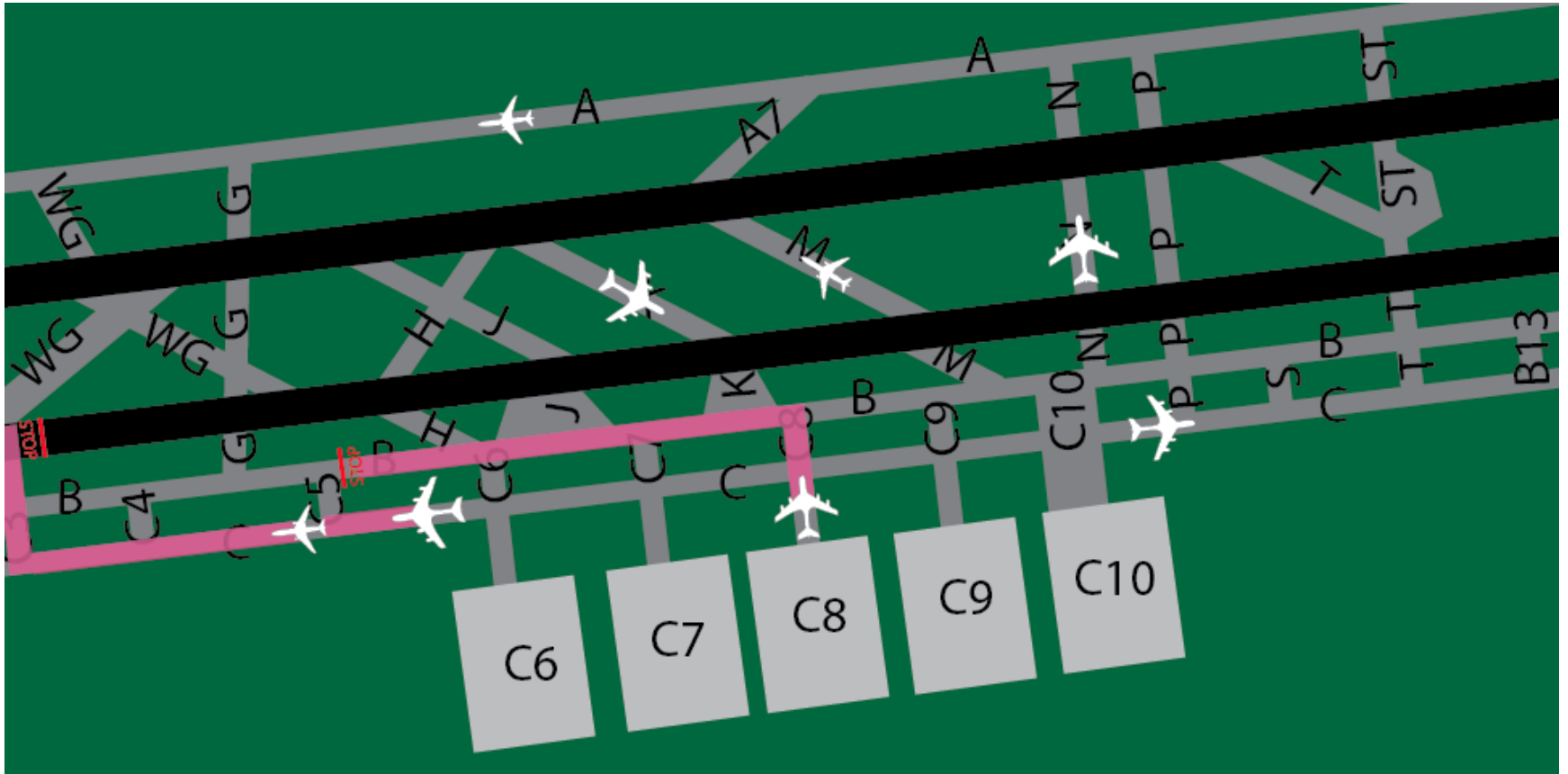
# New Concept







# ATC Benefit



# Continuing on

- **More paper strip exploration**
- **Talking to more pilots & ATC's**

**Thank you!**