Appendix A

Flight Patterns: Visualizing Air Traffic Patterns over the Unites States

Thank you for participating in this Air Traffic Flight Pattern Analysis project to assist Air Traffic Controllers. This document will provide an introductory tutorial for using the prototype of a web-based interactive visualization set of tools for Air Traffic Management. Please help us improve these tools by filling out the questionnaire and providing your comments to our research team after the tutorial exercises. Thank you for helping us refine these on-line tools and web user interfaces. This project will benefit from evaluation by experts like you.

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System Requirements for accessing Web-based Flight Pattern Analysis Tool:

- Hardware: Standard PC or Mac. 2GHz CPU or above recommended,
- Operating System: Windows XP, 7, Mac OS x Mountain Lion, or Linux
- Web Browser: IE 9.0 or above, Firefox 15.0 or above, Google Chrome 23.0 or above
- Screen Resolution: 1024x768 or above recommended

Before we begin…

Please indicate what type of machine you are working on?
[ ] Windows (PC)[ ] Mac [ ] Linux [ ] Other _____

Please indicate what type of Web Browser you are working on?
[ ] Internet Explorer [ ] Firefox [ ] Chrome[ ] Other _____

Please indicate what display resolution you are using?
[ ] 800x600 [ ] 1024x768 [ ] 1280x1024 [ ] Other _____

Where is your test site? _____

What is your job title? _____

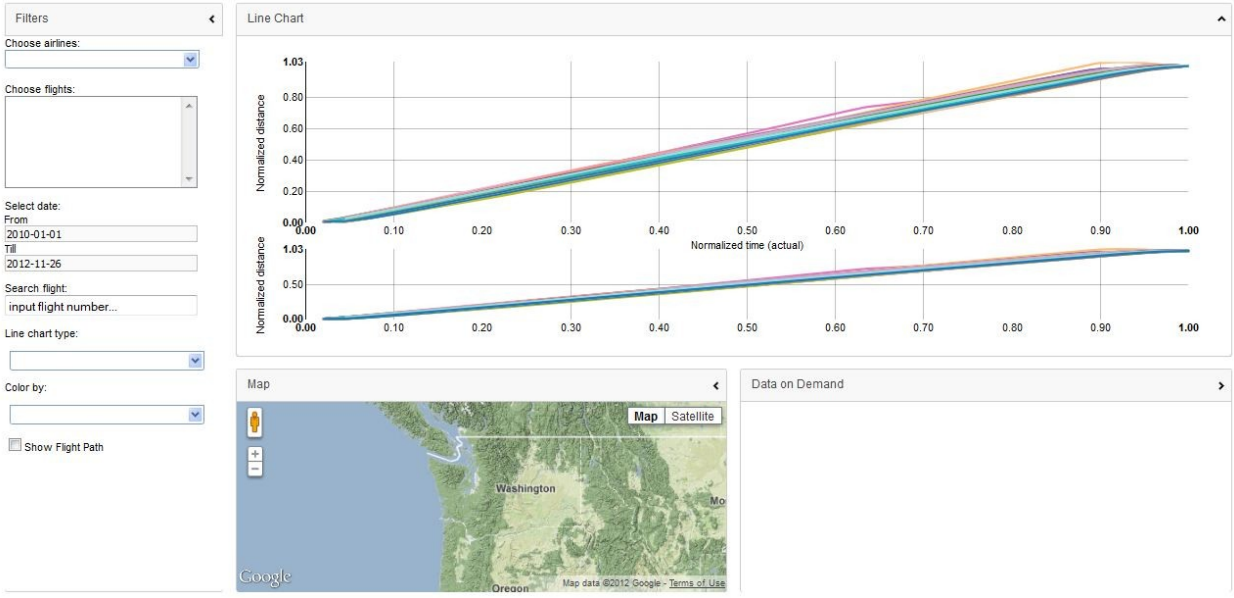
What is today's date? _____
Please write down the time you begin this tutorial. _____ (Hour): _____ (minutes)

SECTION 1 – TUTORIAL (15-20 minutes)

The major goal of this tutorial is to help you become familiar with online interactive visualization of flight pattern analysis tool developed by this project.

The first step is to launch your Web Browser.

- Type file:///term-proj-nada-master/term-proj-nada-master/gui.html on the URL address window.
- You will see the main page for the Flight Pattern Analysis tool as the following picture



- Select airline from the list under the **"Choose Airline"** combo box on the upper left corner on the main page.
- This will populate flights under the **"Choose Flight"** text box.
- Select flight number under the **"Choose Flight"** text box by clicking on it.
- This will load the data pertaining to the flight you've chosen on the line chart. The default line chart presents stacked view of Normalized Distance versus Normalized Actual Time.

- Draw an area of interest by dragging a rectangle on the bottom line chart. This will show zoomed in view of the area of interest on the top line chart. You can always adjust the size of the area of interest by resizing the border lines.
- Select start date indicating the start of the date range for the flights you would like to visualize by either typing in the text box under the **“Start Date”** or selecting the date from the calendar view.
- Select end date indicating the end of the date range for the flights you would like to visualize by either typing in the text box under the **“End Date”** or selecting the date from the calendar view.

- Select line chart type from the combo box for the interactive visualization. Below is list of line chart types:
    1. *Normalized Distance versus Normalized Actual Time*: This line chart displays distance values from the departure airport on Y axis and actual time elapsed since the flight departed from the departure airport on X axis. All values are normalized so that they all range between 0 and 1. Due to fact that non on-time flights take less or more than estimated time, the actual times usually result in non 1 value when the flight arrives to the destination airport.
    2. *Normalized Distance versus Normalized Estimated Time*: This line chart displays distance values from the departure airport on Y axis and estimated time elapsed since the flight departed from the departure airport on X axis. All values are normalized so that they all range between 0 and 1. Due to fact that estimated time represents flight plan, all estimated times result in 1 when the flight arrives to the destination airport.
    3. *Altitude versus Normalized Actual Time*: This line chart displays altitude values from the departure airport on Y axis and actual time elapsed since the flight departed from the departure airport on X axis.
    4. *Speed versus Normalized Actual Time*: This line chart displays speed values from the departure airport on Y axis and actual time elapsed since the flight departed from the departure airport on X axis.
- Select color option under the **“Color by”** combo box. Based upon your selection, the lines will be colored either by flight number or by airline.
- Check the **“Show Flight Path”** box. This will display the animated flight on Google Map view at the bottom of the page.
- Select one of the flights on the top line chart by clicking on it so that its full attributes are displayed on Details on Demand table on lower right corner.

SECTION 2 – QUESTIONNAIRE (15-20 minutes)

Please record the time you completed the tutorial. _____ (Hour): _____ (minutes)

How long did it take you finish this tutorial? _____

Overall Reaction to the Software

terrible wonderful
1 2 3 4 5 6 7 8 9
N/A

difficult easy
1 2 3 4 5 6 7 8 9
N/A

frustrating satisfying
1 2 3 4 5 6 7 8 9
N/A

inadequate power adequate power
1 2 3 4 5 6 7 8 9
N/A

dull stimulating
1 2 3 4 5 6 7 8 9
N/A

rigid flexible
1 2 3 4 5 6 7 8 9
N/A

Screen

Characters on the screen hard to read easy to read
1 2 3 4 5 6 7 8 9
N/A

Icons fuzzy sharp
1 2 3 4 5 6 7 8 9
N/A

Fonts barely legible very legible

1 2 3 4 5 6 7 8 9
N/A

Colors too bright/dark soft/natural

1 2 3 4 5 6 7 8 9
N/A

Lines invisible visible
1 2 3 4 5 6 7 8 9
N/A

Widget positions fixed configurable
1 2 3 4 5 6 7 8 9
N/A

Organization of information confusing very clear
1 2 3 4 5 6 7 8 9
N/A

Terminology and System Information

Use of terms throughout system inconsistent
consistent
1 2 3 4 5 6 7 8 9
N/A

Terminology related to task never always
1 2 3 4 5 6 7 8 9
N/A

Position of messages on screen inconsistent
consistent
1 2 3 4 5 6 7 8 9
N/A

Prompts for input confusing clear
1 2 3 4 5 6 7 8 9
N/A

Error messages unhelpful helpful
1 2 3 4 5 6 7 8 9
N/A

Learning

Learning to operate the system
difficult — easy
1 2 3 4 5 6 7 8 9
N/A

Exploring new features by trial and error
difficult — easy
1 2 3 4 5 6 7 8 9
N/A

Performing tasks is straightforward
never — always
1 2 3 4 5 6 7 8 9
N/A

Help messages on the screen
unhelpful — helpful
1 2 3 4 5 6 7 8 9
N/A

System Capabilities

Overall system speed
too slow — fast enough
1 2 3 4 5 6 7 8 9
N/A

Data loading speed
too slow — fast enough
1 2 3 4 5 6 7 8 9
N/A

Response to user actions (zoom/pan)
too slow — fast enough
1 2 3 4 5 6 7 8 9
N/A

System reliability
unreliable — reliable
1 2 3 4 5 6 7 8 9
N/A

Correcting your mistakes
difficult — easy
1 2 3 4 5 6 7 8 9
N/A

General

List the most negative aspect(s)?

_____
_____
_____

List the most positive aspect(s)?

_____
_____
_____

Can you think of any functions that are missing in the Flight Pattern Analysis Tool? _____

_____
_____

What do you like about this expert review tutorial and questionnaire?

_____
_____
_____

Is there anything you do not like about this expert review tutorial and questionnaire? _____

_____
_____

SECTION 3 – TASKS (10-15 minutes)

Since you have completed the short tutorial, now please perform the following tasks:

1. Display all DAL2410 flights using Normalized Distance versus Normalized Actual Time line chart type.

2. Display all DAL1043 flights between 07/01/2012 and 08/31/2012 using Normalized Distance versus Normalized Estimated Time line chart type.

3. Display ASA678 flight on 07/02/2012 using Altitude versus Normalized Actual Time. Show flight path for this flight. Also, show the attributes for this flight in Details on Demand table.

Thank you for answering this questionnaire for the Air Traffic Flight Pattern Analysis project.

References:

http://map.sdsu.edu/arc/UserTest1new.pdf
http://hcibib.org/perlman/question.cgi?form=QUIS