UNLOCKING INSIGHTS INTO GLOBLE AIR TRANSPORTATION NETWORK

## 1 INTRODUCTION

1.1 Overview

The air transportation network is a complex network which has the properties of small-world networks and scale-free networks. The degree distribution of the nodes displays a heavy-tailed distribution. The hubs of the network have large connectivities and long-distance connectivities at the same time.
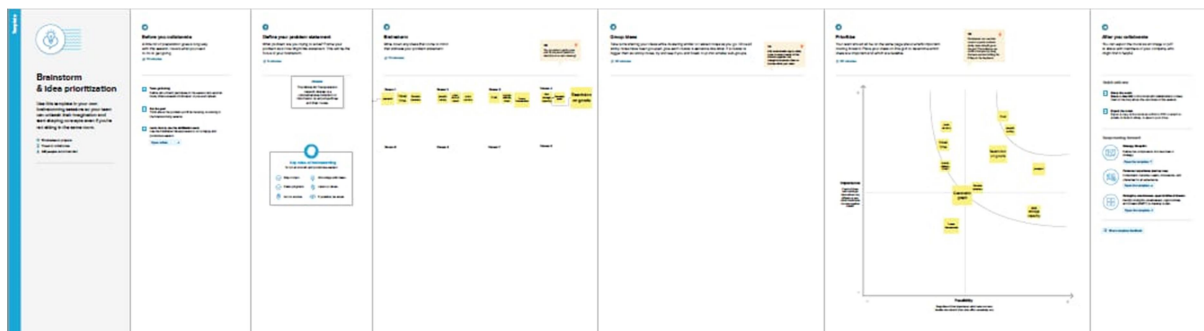
1.2 Purpose

Air transport allows people from different countries to cross international boundaries and travel other countries for personal, business, medical, and tourism purposes.

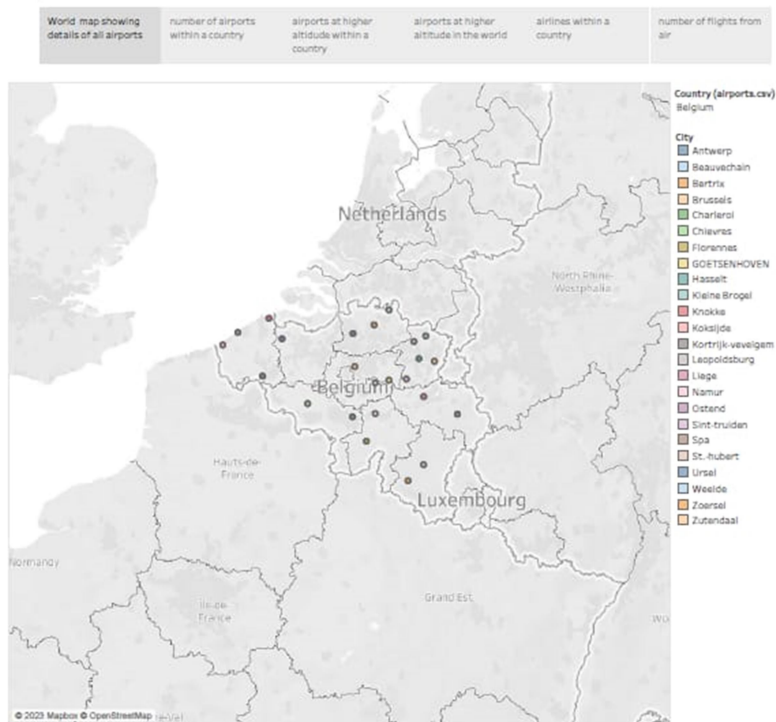## 2. Problem definition & design thinking

2.1 Empathy map
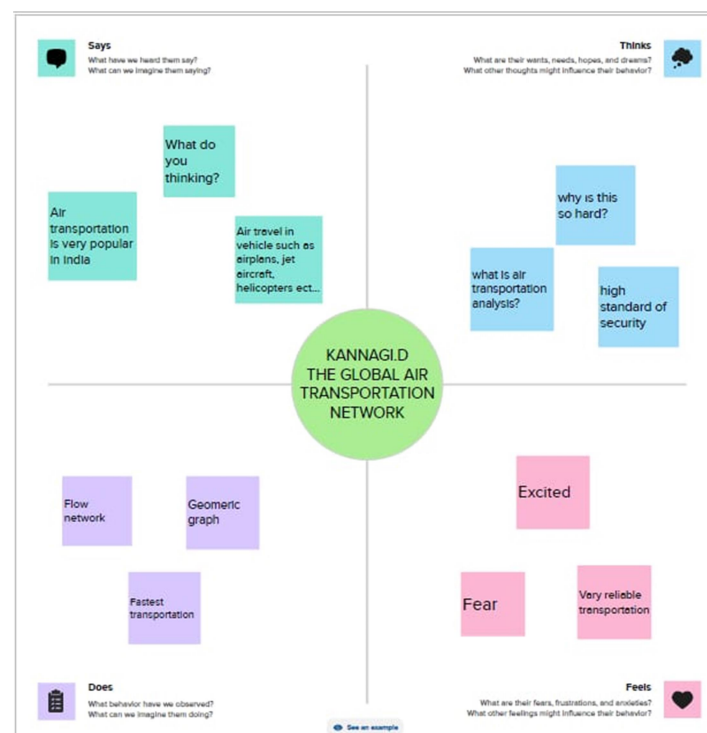
2.2 Ideation & Brainstorming map

3 . RESULT

Story 1

World map showing details of all airports	number of airports within a country	airports at higher altidude within a country	airports at higher altitude in the world	airlines within a country	number of flights from air

22

Country (airports.csv)
Afghanistan

Story 1

World map showing details of all airports	number of airports within a country	airports at higher altidude within a country	airports at higher altitude in the world	airlines within a country	number of flights from air

Index no	Name (airports.csv)	City	ICAO (airpo..	
Null	Bamiyan Airport	Bamyan	OABN	Abc
	Bost Airport	Lashkar Gah	OABT	Abc
	Farah Airport	Farah	OAFR	Abc
	Ghazni Airport	Ghazni	OAGN	Abc
1,979	Herat Airport	Herat	OAHR	Abc
1,980	Jalalabad Airport	Jalalabad	OAJL	Abc
1,981	Hamid Karzai Internation..	Kabul	OAKB	Abc
1,982	Kandahar Airport	Kandahar	OAKN	Abc
1,983	Maimana Airport	Maimama	OAMN	Abc
1,984	Mazar I Sharif Airport	Mazar-i-sharif	OAMS	Abc
1,985	Shindand Airport	Shindand	OASD	Abc
1,986	Sheberghan Airport	Sheberghan	OASG	Abc
1,987	Konduz Airport	Kunduz	OAUZ	Abc
4,597	Fayrabad Airport	Faizabad	OAFZ	Abc
5,345	Bagram Air Base	Kabul	OAIX	Abc
11,765	Tarin Kowt Airport	Tarin Kowt	OATN	Abc
11,767	Zaranj Airport	Zaranj	OAZJ	Abc
11,794	Chakcharan Airport	Chaghcharan	OACC	Abc
16,804	Camp Bastion Airport	Camp Bastion	OAZI	Abc
18,946	Khost Airport	Khost	OAKS	Abc
19,232	Sharana Airstrip	Sharona	OASA	Abc
19,908	Shank Air Base	Shank	OASH	Abc

Country (airports.csv)
Afghanistan

All airports within a country

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Number of air-ports

22

Country (airports.csv)
Belgium

City
- Antwerp
- Beauvechain
- Bertrix
- Brussels
- Charleroi
- Chievres
- Florennes
- GOETSENHOVEN
- Hasselt
- Kleine Brogel
- Knokke
- Koksijde
- Kortrijk-vevelgem
- Leopoldsburg
- Liege
- Namur
- Ostend
- Sint-truiden
- Spa
- St -hubert

Country (airports.csv)
Afghanistan

Country (airports.csv)
Afghanistan

Airports at higher altitude within a country

Index no	Name (airports.csv)	City	ICAO (airpo..	
Null	Bamiyan Airport	Bamyan	OABN	Abc
	Bost Airport	Lashkar Gah	OABT	Abc
	Farah Airport	Farah	OAFR	Abc
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1,981	Hamid Karzai Internation..	Kabul	OAKB	Abc
1,982	Kandahar Airport	Kandahar	OAKN	Abc
1,983	Maimana Airport	Maimama	OAMN	Abc
1,984	Mazar I Sharif Airport	Mazar-i-sharif	OAMS	Abc
1,985	Shindand Airport	Shindand	OASD	Abc

Story 1

Airline ID	Name	Icao	Callsign			Active
-1	Unknown	Null	\N		■	☑ n
1	Private flight	Null	Null		■	☑ N
2	135 Airways	GNL	GENERAL		■	☑ Y
3	1Time Airline	RNX	NEXTIME		■	
4	2 Sqn No 1 Elementary Fly...	WYT	Null		■	
5	213 Flight Unit	TFU	Null		■	Country
6	223 Flight Unit State Airli...	CHD	CHKALOVSK-AVIA		■	All
7	224th Flight Unit	TTF	CARGO UNIT		■	
8	247 Jet Ltd	TWF	CLOUD RUNNER		■	Active
9	3D Aviation	SEC	SECUREX		■	■ n
10	40-Mile Air	MLA	MILE-AIR		■	■ N
11	40 Air	QRT	QUARTET		■	■ Y
12	611897 Alberta Limited	THD	DONUT		■	
13	Ansett Australia	AAA	ANSETT		■	
14	Abacus International	Null	Null		■	
15	Abelag Aviation	AAB	ABG		■	
16	Army Air Corps	AAC	ARMYAIR		■	
17	Aero Aviation Centre Ltd.	AAD	SUNRISE		■	
18	Aero Servicios Ejecutivos ...	SII	ASEISA		■	
19	Aero Biniza	BZS	BINIZA		■	
20	Aero Albatros	ABM	ALBATROS ESPANA		■	
21	Aigle Azur	AAF	AIGLE AZUR		■	
22	Aloha Airlines	AAH	ALOHA		■	
23	Alaska Island Air	AAK	ALASKA ISLAND		■	
24	American Airlines	AAL	AMERICAN		■	
25	Aviation Management Cor...	AAM	AM CORP		■	
26	Atlantis Airlines (USA)	AAO	ATLANTIS AIR		■	
27	Aerovista Airlines	AAP	AEROVISTA GROUP		■	
28	Asiana Airlines	AAR	ASIANA		■	
29	Askari Aviation	AAS	AL-AAS		■	
30	Australia Asia Airlines	AAU	AUSTASIA		■	
31	Astro Air International	AAV	ASTRO-PHIL		■	
32	Afriqiyah Airways	AAW	AFRIQIYAH		■	
33	Afrinat International Airli...	AFU	Null		■	
34	Afric'air Express	AAX	AFREX		■	
35	Allegiant Air	AAY	ALLEGIANT		■	
36	Angus Aviation	AAZ	ANGUS		■	
37	Artem-Avia	ABA	ARTEM-AVIA		■	
38	African Business and Tran...	ABB	AFRICAN BUSINESS-		■	

Story 1

Source airport

Bar chart of number of flights by source airport (Destination airport ID). Airports listed from top to bottom: ATL, PEK, ORD, LAX, DFW, PVG, CAN, CTU, DEN, SIN, XIY, ICN, HKG, CKG, KMG, LHR, JFK, DME, FRA, CLT, SZX, CDG, HGH, MIA, BKK, XMN, PHL, DXB, TPE, IST, SHA, PHX, NRT, KUL, AMS, LAS, CSX.

X-axis (Destination airport ID): 0K, 200K, 400K, 600K, 800K, 1000K, 1200K, 1400K, 1600K, 1800K, 2000K, 2200K, 2400K, 2600K, 2800K, 3000K, 3200K
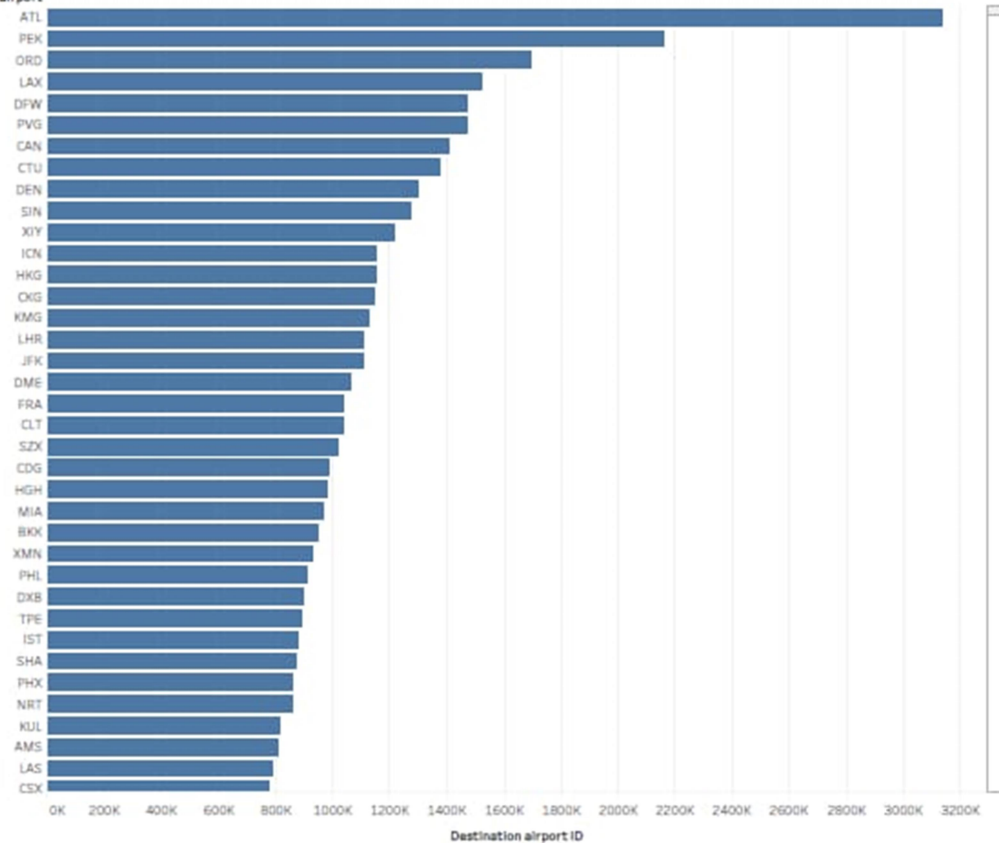
Story 1

Name (airports.csv)	City	ICAO (airports.csv)	
Daocheng Yading Airport	Daocheng	ZUDC	14,472
Qamdo Bangda Airport	Bangda	ZUBD	14,219
Kangding Airport	Kangding	ZUKD	14,042
Ngari Gunsa Airport	Shiquanhe	ZUAL	14,022
El Alto International Airport	La Paz	SLLP	13,355
Capitan Nicolas Rojas Airport	Potosi	SLPO	12,913
Yushu Batang Airport	Yushu	ZYLS	12,816
Copacabana Airport	Copacabana	SLCC	12,591
Inca Manco Capac International Airport	Juliaca	SPJL	12,552
Golog Maqin Airport	Golog	ZLGL	12,426

No of flights from airport

Source airport
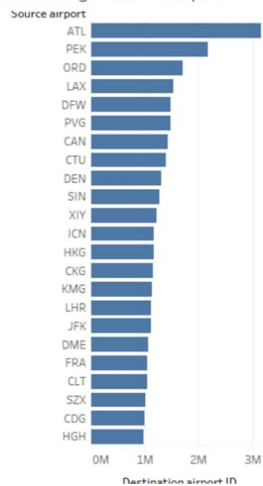
Airports at higher altitude in the world

Name (airports.csv)	City
Daocheng Yading Airport	Daocheng
Qamdo Bangda Airport	Bangda
Kangding Airport	Kangding
Ngari Gunsa Airport	Shiquanhe
El Alto International Airport	La Paz
Capitan Nicolas Rojas Airport	Potosi
Yushu Batang Airport	Yushu
Copacabana Airport	Copacabana
Inca Manco Capac International Airport	Juliaca
Golog Maqin Airport	Golog

Airlines within a country

Airline ID	Name	Icao	Callsigr
-1	Unknown	Null	\N
1	Private flig..	Null	Null
2	135 Airways	GNL	GENERA
3	1Time Airline	RNX	NEXTIM
4	2 Sqn No 1 ..	WYT	Null
5	213 Flight ..	TFU	Null
6	223 Flight ..	CHD	CHKALC
7	224th Fligh..	TTF	CARGO
8	247 Jet Ltd	TWF	CLOUD
9	3D Aviation	SEC	SECURE
10	40-Mile Air	MLA	MILE-AI
11	4D Air	QRT	QUARTE
12	611897 Alb..	THD	DONUT
13	Ansett Aust..	AAA	ANSETT
14	Abacus Inte..	Null	Null
15	Abelag Avia..	AAB	ABG
16	Army Air Co..	AAC	ARMYA
17	Aero Aviati..	AAD	SUNRIS
18	Aero Servici..	SII	ASEISA
19	Aero Biniza	BZS	BINIZA
20	Aero Albatr..	ABM	ALBATR
21	Aigle Azur	AAF	AIGLE A
22	Aloha Airlin..	AAH	ALOHA
23	Alaska Isla..	AAK	ALASKA
24	American Ai..	AAL	AMERIC

Active
- ☑ n
- ☑ N
- ☑ Y

Country
All

Active
- 🟥 n
- 🟦 N
- 🟧 Y

4. ADVANTAGES & DISADVANTAGE

Advantages

1.Hight speed

2.Fast survice

3. Send almost everywhere

Disadvantages

1.Risky

2.Cost

3.Capacity for small carriage

5. APPLICATIONS

An alternative application is modeling human disease networks. Air transport network is used by millions of people every day, therefore it plays key role in the spread of some infections, such as influenza or SARS. In this sense air transport network is a transmitter similar to sexual networks, which is liable for the spread of AIDS and other sexually transmitted diseases.

6. CONCLUSION

The airline industry is a network based industry that lives from the interaction among the various parts of the system aircrafts`, airports, passengers, aviation policy

7. FUTURE SCOPE

Emerging technologies are reshaping with robotics, artificial intelligence, the internet of things, unmanned aircraft systems and the push for hybrid and electric airplanes – just to name a few. Alternative fuels can significantly change the current scenario of aviation in support of the environmental protection.