UNLOCKING INSIGHTS INTO THE GLOBAL AIR TRANSPORTATION NETWORK WITH TABLEAU
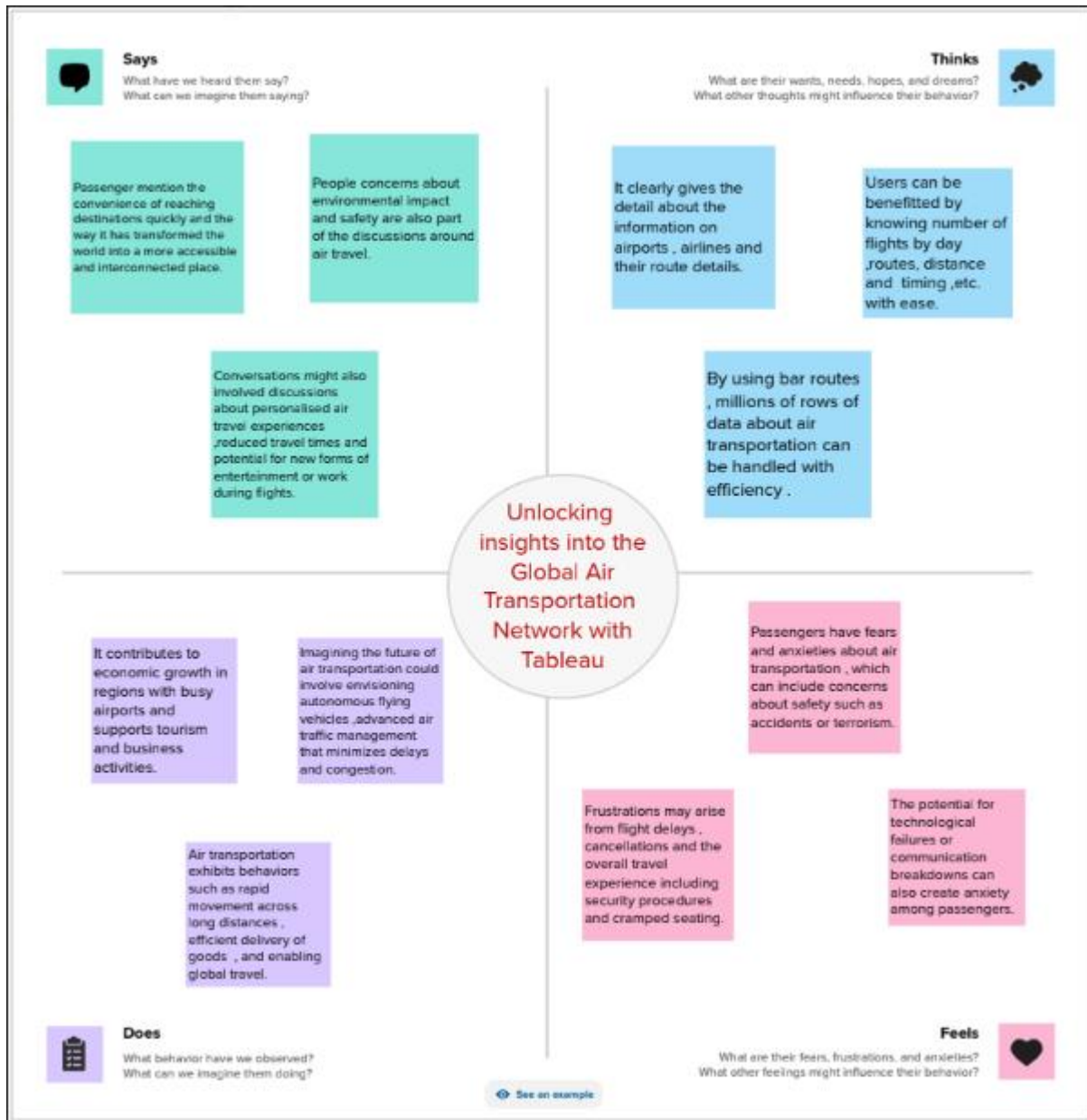
1 . INTRODUCTION

1.1 overview

"Unlocking Insights into the Global Air transportation Network with Tableau" is a data visualization project aimed at providing valuable insights and understanding of the worldwide aviation system . This project utilizes the Tableau platform to create interactive and informative visualizations based on comprehensive data related to airport , airlines , routes , and passenger traffic . The key components of this include : Data Aggregation , Data Preparation ,Visual story telling , Geospatial visualization , Time series analysis , Inter activity and filters , Insightful annotation , Sharing and collaboration and Continuous updates. Overall, this project aims to unlock valuable insights into the complex global air transportation network , making it easier for stakeholders, researchers , and the general public to understand the dynamics , trends, and challenges in the aviation industry using interactive Tableau visualization.
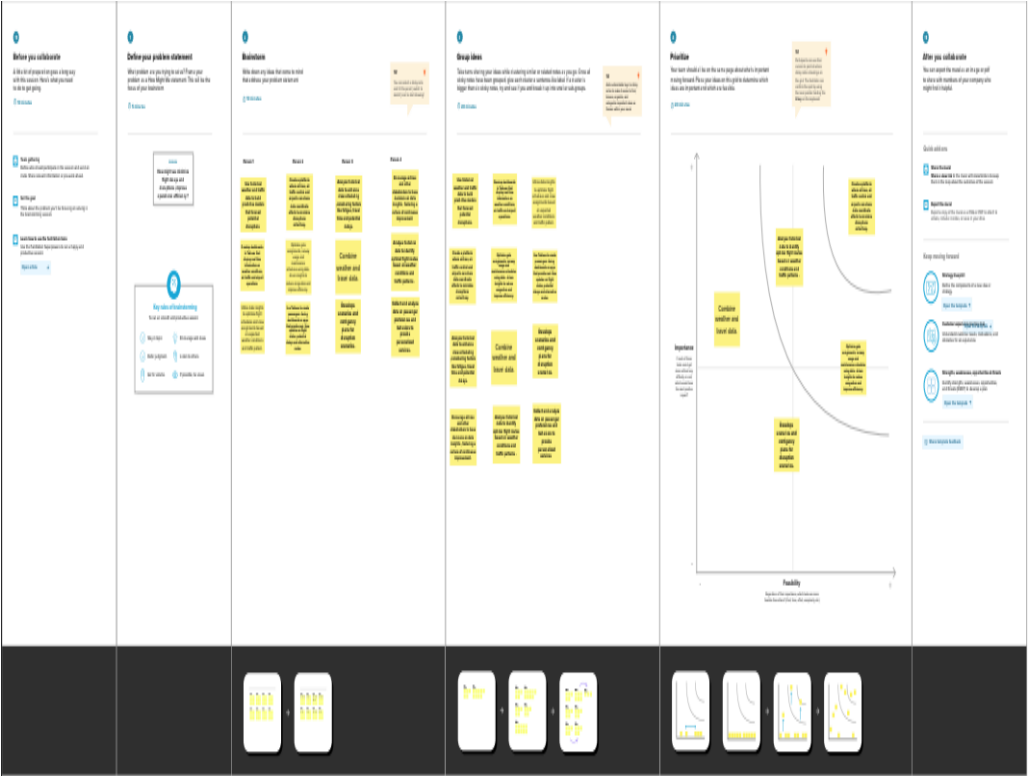
1.2 Purpose

The project "Unlocking Insights into the Global Air Transportation Network with Tableau" serves several important purposes and can lead to numerous achievements and benefits . They are Strategic planning , Market analysis , Passenger experience enhancement , Cost optimization , Emergency response , Environmental impact assessment , Tourism development , Research and education , Public awareness , Data-driven Decision- making. The project Unlocking insights into the global air transportation network with Tableau to improve decision -making , optimize operations , enhance the passenger experience , and contribute to sustainability efforts . By visualizing complex data in an accessible manner , it enables a wide range of stakeholders to extract valuable information and achieve various goals related to aviation and transportation .

2 . PROBLEM DEFINITION AND DESIGN THINKING

2.1 Empathy map

Says
What have we heard them say?
What can we imagine them saying?

Passenger mention the convenience of reaching destinations quickly and the way it has transformed the world into a more accessible and interconnected place.

People concerns about environmental impact and safety are also part of the discussions around air travel.

Conversations might also involved discussions about personalised air travel experiences ,reduced travel times and potential for new forms of entertainment or work during flights.

Thinks
What are their wants, needs, hopes, and dreams?
What other thoughts might influence their behavior?

It clearly gives the detail about the information on airports , airlines and their route details.

Users can be benefitted by knowing number of flights by day ,routes, distance and timing ,etc. with ease.

By using bar routes , millions of rows of data about air transportation can be handled with efficiency .

Unlocking insights into the Global Air Transportation Network with Tableau

It contributes to economic growth in regions with busy airports and supports tourism and business activities.

Imagining the future of air transportation could involve envisioning autonomous flying vehicles ,advanced air traffic management that minimizes delays and congestion.

Air transportation exhibits behaviors such as rapid movement across long distances , efficient delivery of goods , and enabling global travel.

Passengers have fears and anxieties about air transportation , which can include concerns about safety such as accidents or terrorism.

Frustrations may arise from flight delays , cancellations and the overall travel experience including security procedures and cramped seating.

The potential for technological failures or communication breakdowns can also create anxiety among passengers.

Does
What behavior have we observed?
What can we imagine them doing?

Feels
What are their fears, frustrations, and anxieties?
What other feelings might influence their behavior?
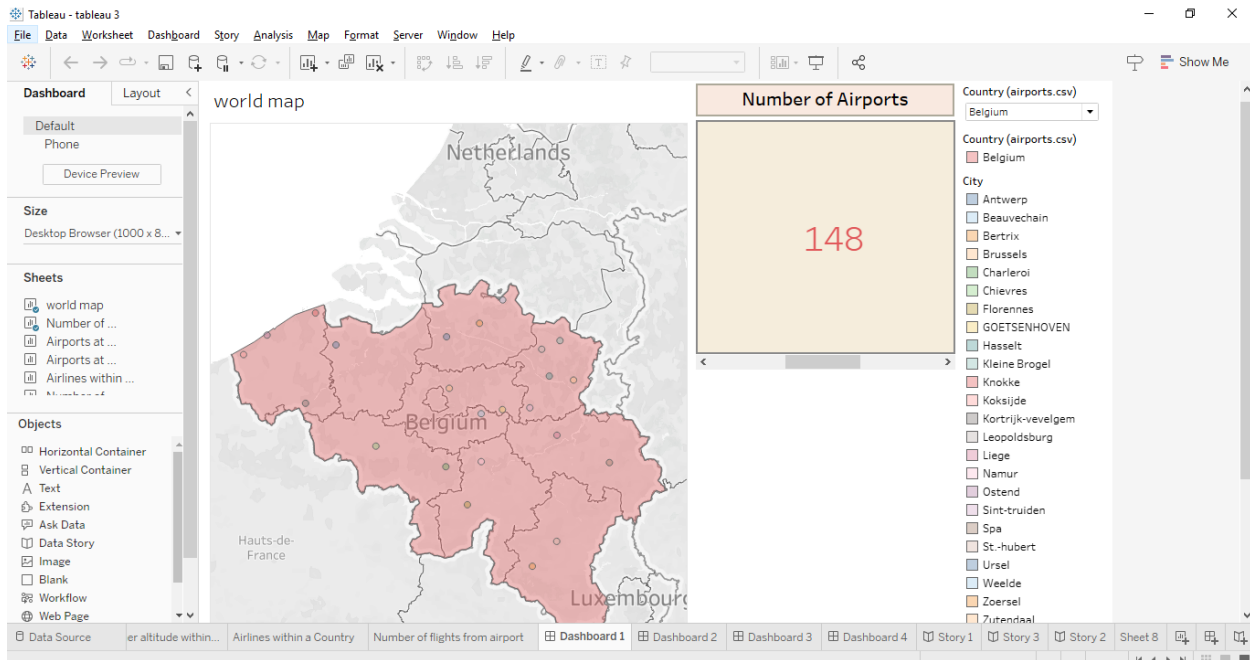
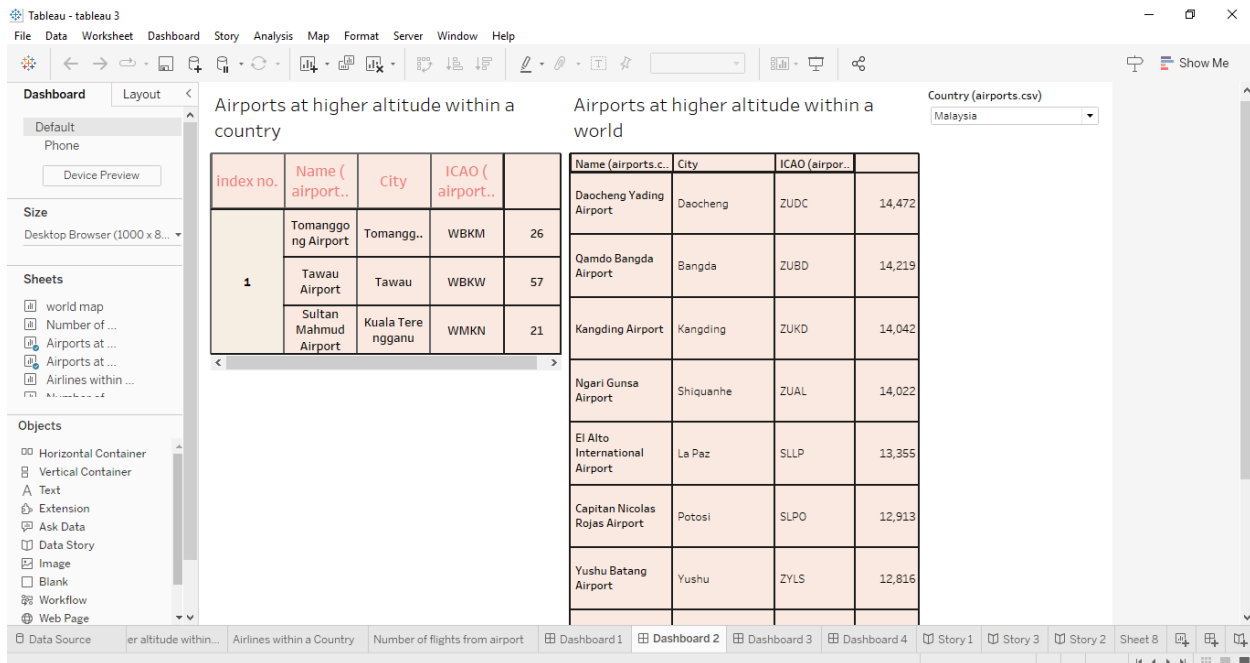See an example

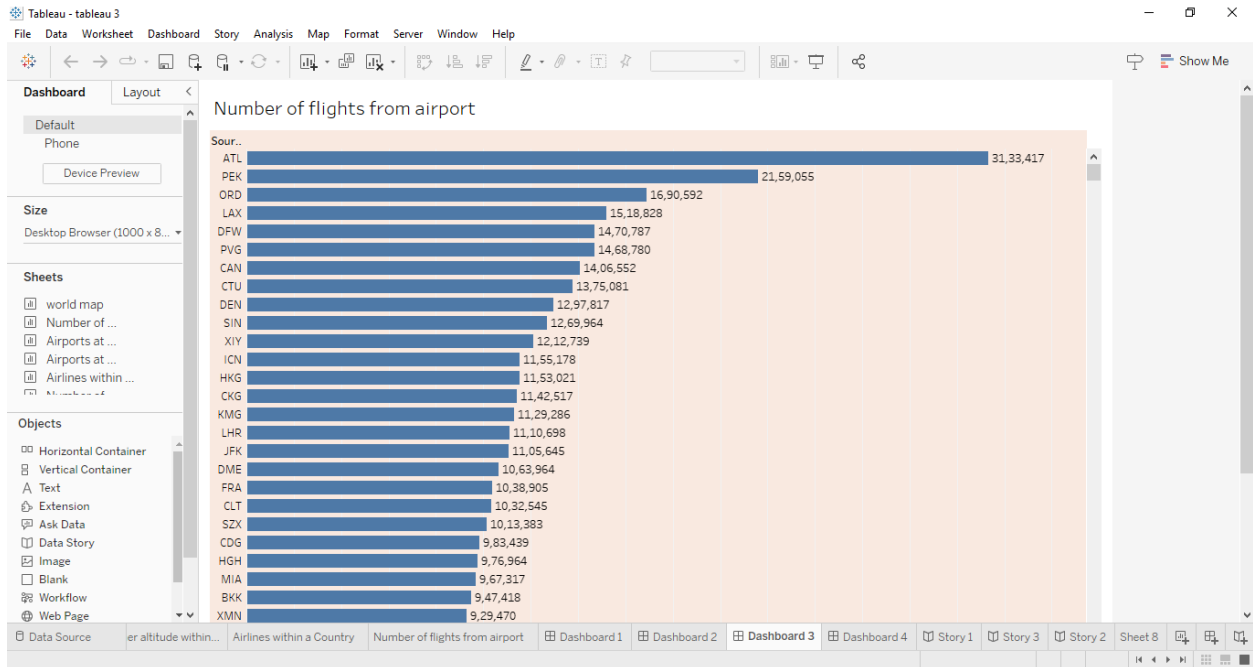## 2.2 Ideation & Brainstorming Map

3 . RESULT
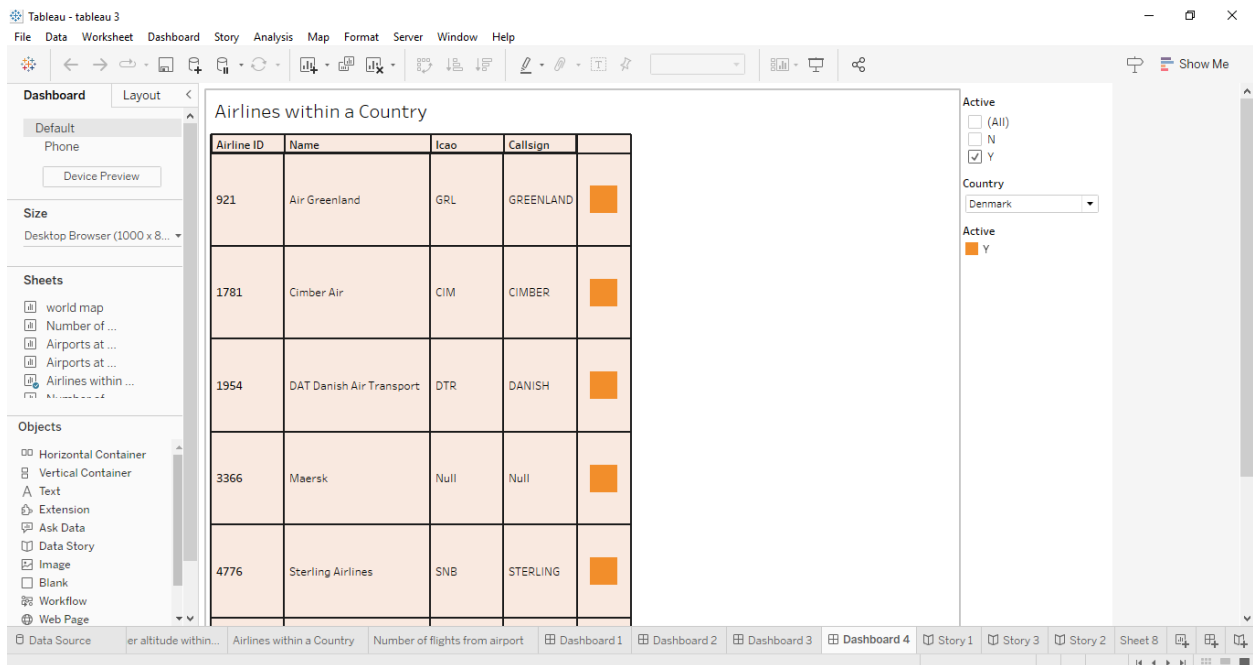
Dashboard showing World map and Number of Airports

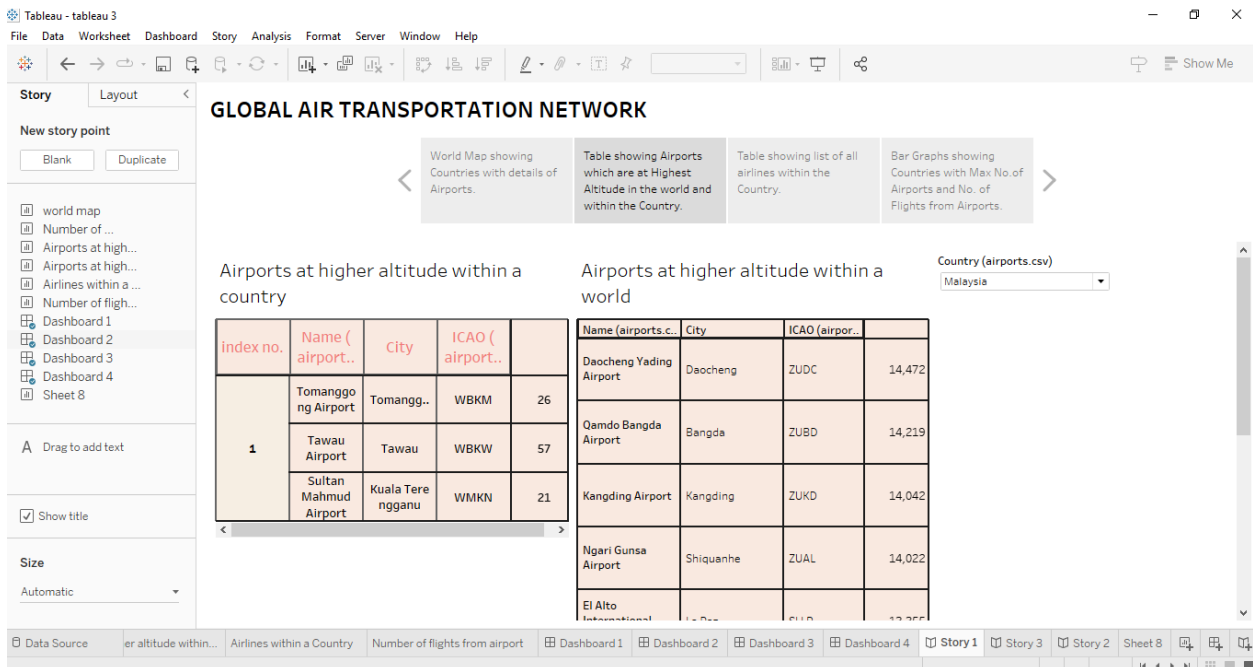Dashboard showing Airports at higher altitude within the country and world

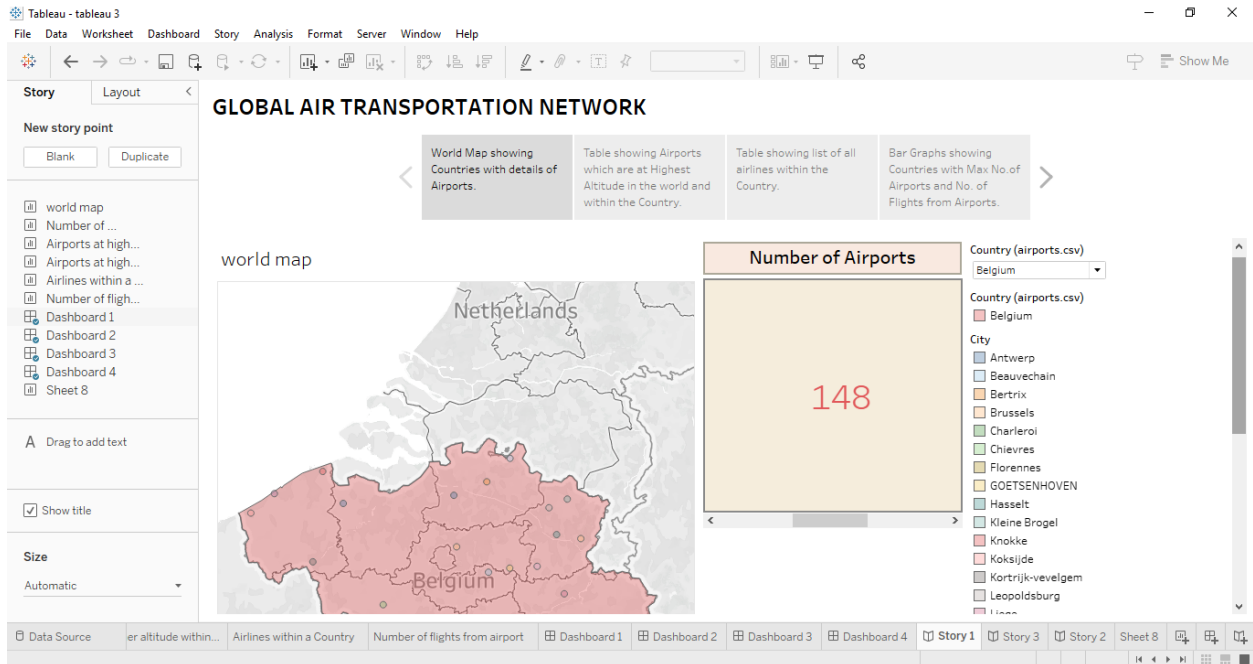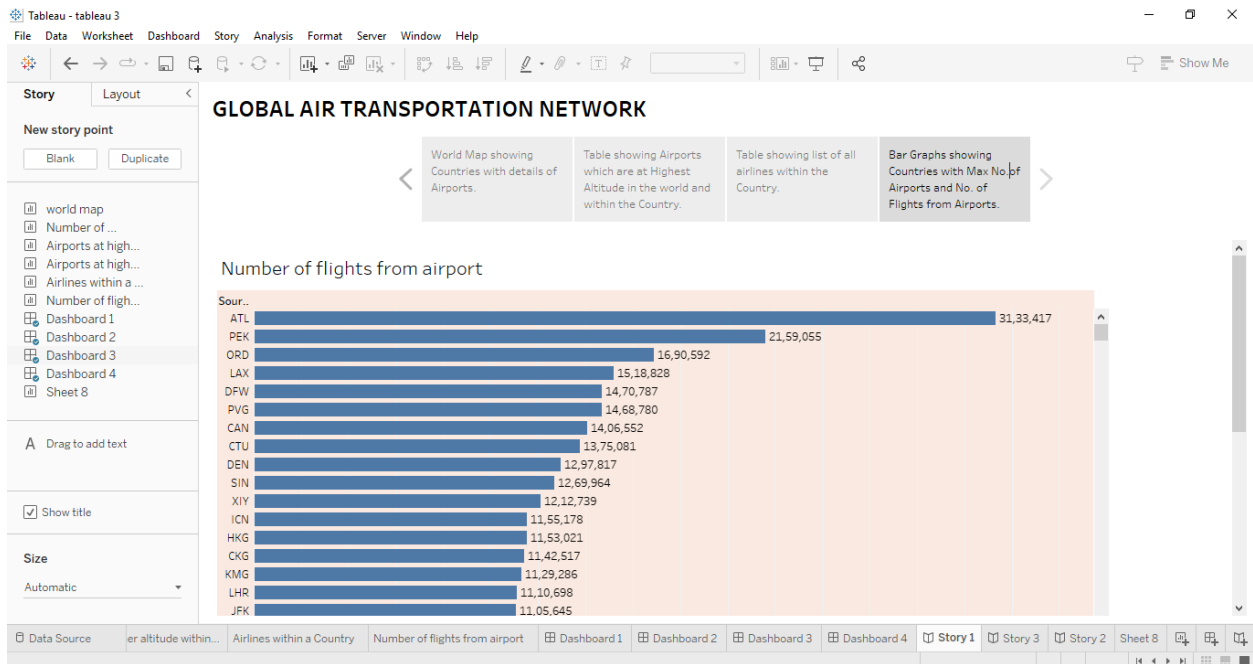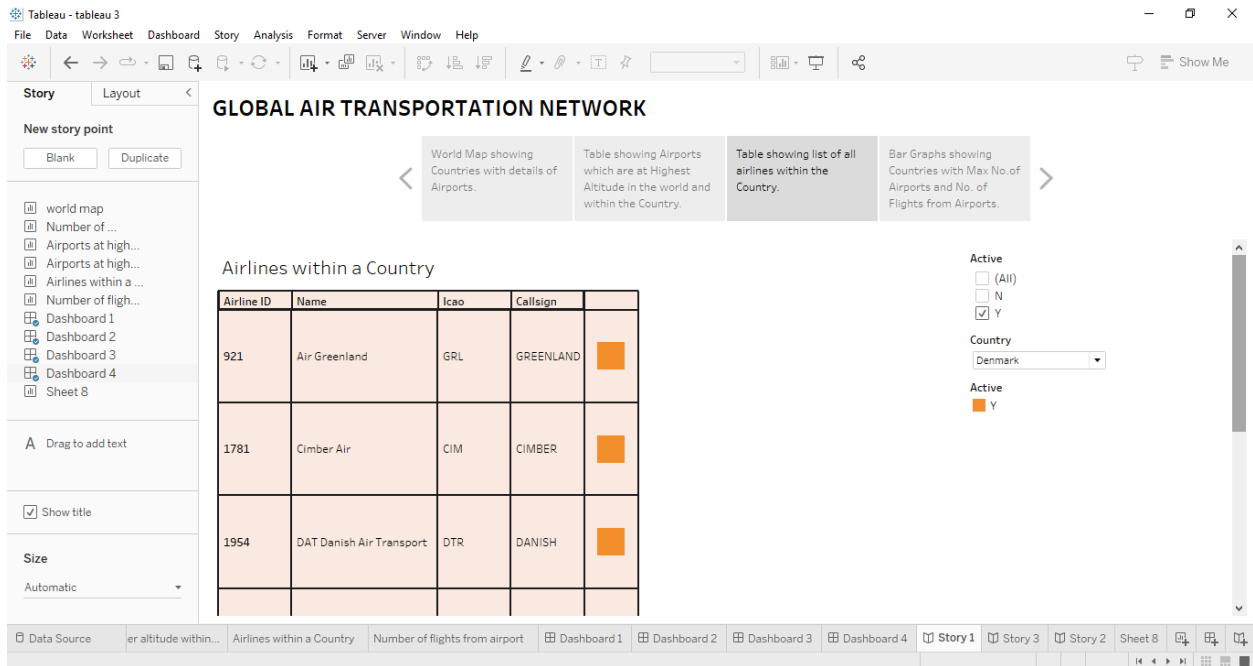# Dashboard showing Number of flights from Airport

Dashboard showing Airlines within a Country

Story :

GLOBAL AIR TRANSPORTATION NETWORK

World Map showing Countries with details of Airports.

Table showing Airports which are at Highest Altitude in the world and within the Country.

Table showing list of all airlines within the Country.

Bar Graphs showing Countries with Max No.of Airports and No. of Flights from Airports.

Airlines within a Country

Airline ID	Name	Icao	Callsign	
921	Air Greenland	GRL	GREENLAND	
1781	Cimber Air	CIM	CIMBER	
1954	DAT Danish Air Transport	DTR	DANISH	

Active
- (All)
- N
- Y ✓

Country
Denmark

Active
Y

Story: world map, Number of ..., Airports at high..., Airports at high..., Airlines within a ..., Number of fligh..., Dashboard 1, Dashboard 2, Dashboard 3, Dashboard 4, Sheet 8

New story point — Blank / Duplicate

Drag to add text — Show title — Size: Automatic

Data Source | er altitude within... | Airlines within a Country | Number of flights from airport | Dashboard 1 | Dashboard 2 | Dashboard 3 | Dashboard 4 | Story 1 | Story 3 | Story 2 | Sheet 8

GLOBAL AIR TRANSPORTATION NETWORK

World Map showing Countries with details of Airports.

Table showing Airports which are at Highest Altitude in the world and within the Country.

Table showing list of all airlines within the Country.

Bar Graphs showing Countries with Max No.of Airports and No. of Flights from Airports.

Number of flights from airport

Sour..	
ATL	31,33,417
PEK	21,59,055
ORD	16,90,592
LAX	15,18,828
DFW	14,70,787
PVG	14,68,780
CAN	14,06,552
CTU	13,75,081
DEN	12,97,817
SIN	12,69,964
XIY	12,12,739
ICN	11,55,178
HKG	11,53,021
CKG	11,42,517
KMG	11,29,286
LHR	11,10,698
JFK	11,05,645

Story: world map, Number of ..., Airports at high..., Airports at high..., Airlines within a ..., Number of fligh..., Dashboard 1, Dashboard 2, Dashboard 3, Dashboard 4, Sheet 8

New story point — Blank / Duplicate

Drag to add text — Show title — Size: Automatic

Data Source | er altitude within... | Airlines within a Country | Number of flights from airport | Dashboard 1 | Dashboard 2 | Dashboard 3 | Dashboard 4 | Story 1 | Story 3 | Story 2 | Sheet 8

4 . ADVANTAGES & DISADVANTAGES

Advantages :

- Data Visualization : Tableau excels at creating visually appealing and interactive data visualisations. This can make it easier to understand complex data related to the global air transportation network.
- Easy to use : Tableau is known for its user – friendly interface , making it accessible to users with varying levels of technical expertise .
- Real – time Updates : You can connect Tableau to real time data sources , allowing you to monitor changes in the air transportation as they happen .
- Interactivity : Tableau dashboards can be interactive , allowing users to explore data and customize views according to their needs .
- Integration : Tableau can integrate with various data sources , making it suitable for analysing a wide range of data related to air transportation , such as flight schedules, weather data and passenger demographics .
- Scalability : Tableau is scalable , meaning it can handle large datasets , making it suitable for analysing the vast amount of data generated by the global air transportation network .
- Economic Benefits : Transportation network create jobs and stimulate economic activity through infrastructure development and maintenance.

Disadvantages :

- Cost : Tableau can be expensive , especially for larger organizations or projects that require multiple licenses and extensive data storage.
- Learning Curve : While Tableau is user- friendly , it still has a learning curve , and users may need training to use it effectively.
- Data security : Managing sensitive data in Tableau requires careful attention to data security protocols to prevent unauthorized access.
- Performance issues : Large datasets can sometime lead to performance issues , slowing down the rendering of visualizing and dashboards.
- Limited analyses depth : For advanced statistical analysis or machine learning , Tableau may not be as powerful as dedicated data science tools like Python or R.

5 APPLICATIONS :

Optimizing flight routes for fuel efficiency , weather conditions , congestion management. Enhancing air traffic control systems for safer and more efficient airspace utilization. Predictive maintenance for aircraft , engines , and components , reducing downtime and improving safety. Improving the passenger experience through personalized services , entertainment and efficient boarding process. Streamlining cargo handling and tracking , optimizing cargo routes , and ensuring secure transportation. Enhancing security measures through advanced screening technologies and threat detection systems. Developing eco-friendly solution to reduce aviation's environmental impact's such as alternative fuels and emissions monitoring. Optimizing

ground operations , baggage headline , and passenger flow within airports.

6   CONCLUSION:

In conclusion , the project focused on unlocking valuable insights into the global air transportation network using the powerful data visualization tool , Tableau. The air transportation sector is a dynamic and essential component of modern society. Its ongoing evolution and adaptation to challenges ensure that it will continue to shape our world in the years to come.

LINK FOR VIDEO DEMONSTRATION :

https://drive.google.com/file/d/16rg-B3lSVsMzV6MZYr73IFJuNpe7BOaX/view?usp=drivesdk

7   FUTURE SCOPE:

The project Unlocking insights into the Global Air Transportation Network with Tableau to thee next level , consider enhancing your data sources by incorporating real -time data feeds from airlines and airports . This will provide up to the minute information for more accurate analysis . Additionally , explore advanced Tableau features like predictive analytics and machine learning integration to forecast trends and optimize flight routes . Collaborate with domain experts to create meaningful dashboards that offer actionable insights , and finally focus in data visualization techniques to make the information more accessible and actionable for stakeholders in the aviation industry . This holistic approach will elevate your project to new heights. Encourage public-private partnerships to secure funding and expertise for network development projects. Invest in passenger comfort and convenience , including digital services , airport lounges , and improving security processes.

8   APPENDIX:

Source code for Dashboard 1 :

```html
<!DOCTYPE html>

<html lang="en">

<head>

    <meta charset="UTF-8">

    <meta name="viewport" content="width=device-width, initial-scale=1.0">

    <title>Air Transportation Dashboard</title>

    <!-- Add your CSS stylesheets and JavaScript libraries here -->

</head>

<body>

    <header>

        <h1>Air Transportation Dashboard</h1>

    </header>

    <nav>

        <!-- Add navigation links here -->

    </nav>

    <main>

        <section id="overview">

            <h2>Overview</h2>

            <!-- Add an overview of your project here -->

        </section>

        <section id="data">

            <h2>Data Visualization</h2>

            <div class='tableauPlaceholder' id='viz1696549506208'
style='position: relative'><noscript><a href='#'><img alt='Dashboard 1 '
src='https://public.tableau.com/static/images/GL/GLOBALAIRTRANSPORTATIONDashboard
```

```
1/Dashboard1/1_rss.png' style='border: none' /></a></noscript><object
class='tableauViz'  style='display:none;'><param name='host_url'
value='https%3A%2F%2Fpublic.tableau.com%2F' /> <param name='embed_code_version'
value='3' /> <param name='site_root' value='' /><param name='name'
value='GLOBALAIRTRANSPORTATIONDashboard1/Dashboard1' /><param name='tabs'
value='no' /><param name='toolbar' value='yes' /><param name='static_image'
value='https://public.tableau.com/static/images/GL/GLOBALAIRTRANSPORTATIONDashboa
rd1/Dashboard1/1.png' /> <param name='animate_transition' value='yes' /><param
name='display_static_image' value='yes' /><param name='display_spinner'
value='yes' /><param name='display_overlay' value='yes' /><param
name='display_count' value='yes' /><param name='language' value='en-US' /><param
name='filter' value='publish=yes' /></object></div>                <script
type='text/javascript'>                    var divElement =
document.getElementById('viz1696549506208');                    var vizElement =
divElement.getElementsByTagName('object')[0];                    if (
divElement.offsetWidth > 800 ) {
vizElement.style.width='1000px';vizElement.style.height='827px';} else if (
divElement.offsetWidth > 500 ) {
vizElement.style.width='1000px';vizElement.style.height='827px';} else {
vizElement.style.width='100%';vizElement.style.height='877px';}
var scriptElement = document.createElement('script');
scriptElement.src = 'https://public.tableau.com/javascripts/api/viz_v1.js';
vizElement.parentNode.insertBefore(scriptElement, vizElement);
</script>

        </section>


</body>

</html>
```

Source code for Dashboard 2 :

```
<html lang="en">

    <meta charset="UTF-8">

<head><!DOCTYPE html>




<body>
```

```html
    <meta name="viewport" content="width=device-width, initial-scale=1.0">
    <title>Air Transportation Dashboard</title>
    <!-- Add your CSS stylesheets and JavaScript libraries here -->
</head>
    <header>
        <h1>Air Transportation Dashboard</h1>
    </header>
    <nav>
        <!-- Add navigation links here -->
    </nav>
    <main>
        <section id="overview">
            <h2>Overview</h2>
            <!-- Add an overview of your project here -->
        </section>
        <section id="data">
            <h2>Data Visualization</h2>
            <div class='tableauPlaceholder' id='viz1696562511616'
style='position: relative'><noscript><a href='#'><img alt='Dashboard 2 '
src='https://public.tableau.com/static/images/GL/GLOBALAIRTRANSPORTATIONDashboard
2/Dashboard2/1_rss.png' style='border: none' /></a></noscript><object
class='tableauViz'  style='display:none;'><param name='host_url'
value='https%3A%2F%2Fpublic.tableau.com%2F' /> <param name='embed_code_version'
value='3' /> <param name='site_root' value='' /><param name='name'
value='GLOBALAIRTRANSPORTATIONDashboard2/Dashboard2' /><param name='tabs'
value='no' /><param name='toolbar' value='yes' /><param name='static_image'
value='https://public.tableau.com/static/images/GL/GLOBALAIRTRANSPORTATIONDashboa
rd2/Dashboard2/1.png' /> <param name='animate_transition' value='yes' /><param
name='display_static_image' value='yes' /><param name='display_spinner'
value='yes' /><param name='display_overlay' value='yes' /><param
name='display_count' value='yes' /><param name='language' value='en-US'
/></object></div>                <script type='text/javascript'>
var divElement = document.getElementById('viz1696562511616');
var vizElement = divElement.getElementsByTagName('object')[0];
if ( divElement.offsetWidth > 800 ) {
```

```
vizElement.style.width='1000px';vizElement.style.height='827px';} else if (
divElement.offsetWidth > 500 ) {
vizElement.style.width='1000px';vizElement.style.height='827px';} else {
vizElement.style.width='100%';vizElement.style.height='727px';}
var scriptElement = document.createElement('script');
scriptElement.src = 'https://public.tableau.com/javascripts/api/viz_v1.js';
vizElement.parentNode.insertBefore(scriptElement,

vizElement);                          </script>

        </section>

    <meta name="viewport" content="width=device-width, initial-scale=1.0">

    <title>Air Transportation Dashboard</title>



</body>

</html>
```

Source code for Dashboard 3 :

```
<!DOCTYPE html>

<html lang="en">

<head>

    <meta charset="UTF-8">

    <!-- Add your CSS stylesheets and JavaScript libraries here -->

</head>

<body>

    <header>

        <h1>Air Transportation Dashboard</h1>

    </header>

    <nav>

        <!-- Add navigation links here -->

    </nav>

    <main>
```

```html
        <section id="overview">

            <h2>Overview</h2>

            <!-- Add an overview of your project here -->

        </section>

        <section id="data">

            <h2>Data Visualization</h2>

            <!-- Add data visualization components and charts here -->

        </section>

        <div class='tableauPlaceholder' id='viz1696562921019' style='position:
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src='https://public.tableau.com/static/images/GL/GLOBALAIRTRANSPORTATIONDashboard
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class='tableauViz'  style='display:none;'><param name='host_url'
value='https%3A%2F%2Fpublic.tableau.com%2F' /> <param name='embed_code_version'
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name='display_static_image' value='yes' /><param name='display_spinner'
value='yes' /><param name='display_overlay' value='yes' /><param
name='display_count' value='yes' /><param name='language' value='en-US' /><param
name='filter' value='publish=yes' /></object></div>                <script
type='text/javascript'>                    var divElement =
document.getElementById('viz1696562921019');                    var vizElement =
divElement.getElementsByTagName('object')[0];                    if (
divElement.offsetWidth > 800 ) {
vizElement.style.width='1000px';vizElement.style.height='827px';} else if (
divElement.offsetWidth > 500 ) {
vizElement.style.width='1000px';vizElement.style.height='827px';} else {
vizElement.style.width='100%';vizElement.style.height='727px';}
var scriptElement = document.createElement('script');
scriptElement.src = 'https://public.tableau.com/javascripts/api/viz_v1.js';
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</script>

</body>

</html>
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Source code for Dashboard 4 :

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<html lang="en">

<head>

    <meta charset="UTF-8">

    <meta name="viewport" content="width=device-width, initial-scale=1.0">

    <title>Air Transportation Dashboard</title>

    <!-- Add your CSS stylesheets and JavaScript libraries here -->

</head>

<body>

    <header>

        <h1>Air Transportation Dashboard</h1>

    </header>

    <nav>

        <!-- Add navigation links here -->

    </nav>

    <main>

        <section id="overview">

            <h2>Overview</h2>

            <!-- Add an overview of your project here -->

        </section>

        <section id="data">

            <h2>Data Visualization</h2>

            <<div class='tableauPlaceholder' id='viz1696573387940'
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src='https://public.tableau.com/static/images/GL/GLOBALAIRTRANSPORTATIONDashboard
4/Dashboard4/1_rss.png' style='border: none' /></a></noscript><object
class='tableauViz'  style='display:none;'><param name='host_url'
value='https%3A%2F%2Fpublic.tableau.com%2F' /> <param name='embed_code_version'
value='3' /> <param name='site_root' value='' /><param name='name'
value='GLOBALAIRTRANSPORTATIONDashboard4/Dashboard4' /><param name='tabs'
value='no' /><param name='toolbar' value='yes' /><param name='static_image'
```

```
value='https://public.tableau.com/static/images/GL/GLOBALAIRTRANSPORTATIONDashboa
rd4/Dashboard4/1.png' /> <param name='animate_transition' value='yes' /><param
name='display_static_image' value='yes' /><param name='display_spinner'
value='yes' /><param name='display_overlay' value='yes' /><param
name='display_count' value='yes' /><param name='language' value='en-US'
/></object></div>                  <script type='text/javascript'>
var divElement = document.getElementById('viz1696573387940');
var vizElement = divElement.getElementsByTagName('object')[0];
if ( divElement.offsetWidth > 800 ) {
vizElement.style.width='1000px';vizElement.style.height='827px';} else if (
divElement.offsetWidth > 500 ) {
vizElement.style.width='1000px';vizElement.style.height='827px';} else {
vizElement.style.width='100%';vizElement.style.height='727px';}
var scriptElement = document.createElement('script');
scriptElement.src = 'https://public.tableau.com/javascripts/api/viz_v1.js';
vizElement.parentNode.insertBefore(scriptElement, vizElement);
</script>

        </section>


</body>

</html>
```

Source code for Story :

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<!DOCTYPE html>

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    <meta charset="UTF-8">

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    <title>Air Transportation Dashboard</title>

    <!-- Add your CSS stylesheets and JavaScript libraries here -->

</head>

<body>

    <header>

        <h1>Air Transportation Dashboard</h1>
```

```html
    </header>

    <nav>

        <!-- Add navigation links here -->

    </nav>

    <main>

        <section id="overview">

            <h2>Overview</h2>

            <!-- Add an overview of your project here -->

        </section>

        <section id="data">

            <h2>Data Visualization</h2>

            <div class='tableauPlaceholder' id='viz1696573647967'
style='position: relative'><noscript><a href='#'><img alt='GLOBAL AIR
TRANSPORTATION NETWORK '
src='https://public.tableau.com/static/images/Gl/Globalairtransportationnetwork_1
6964960195700/Story1/1_rss.png' style='border: none' /></a></noscript><object
class='tableauViz'  style='display:none;'><param name='host_url'
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value='no' /><param name='toolbar' value='yes' /><param name='static_image'
value='https://public.tableau.com/static/images/Gl/Globalairtransportationnetwork
_16964960195700/Story1/1.png' /> <param name='animate_transition' value='yes'
/><param name='display_static_image' value='yes' /><param name='display_spinner'
value='yes' /><param name='display_overlay' value='yes' /><param
name='display_count' value='yes' /><param name='language' value='en-US'
/></object></div>                <script type='text/javascript'>
var divElement = document.getElementById('viz1696573647967');
var vizElement = divElement.getElementsByTagName('object')[0];
vizElement.style.width='100%';vizElement.style.height=(divElement.offsetWidth*0.7
5)+'px';                    var scriptElement = document.createElement('script');
scriptElement.src = 'https://public.tableau.com/javascripts/api/viz_v1.js';
vizElement.parentNode.insertBefore(scriptElement, vizElement);
</script>

        </section>
```

URL FOR DASHBOARD 1 :

US&publish=yes&:display_count=https://public.tableau.com/views/GLOBALAIRTR
ANSPORTATIONDashboard1/Dashboard1?:language=en-n&:origin=viz_share_link

URL FOR DASHBOARD 2 :

https://public.tableau.com/views/GLOBALAIRTRANSPORTATIONDashboard2/Das
hboard2?:language=en-US&:display_count=n&:origin=viz_share_link

URL FOR DASHBOARD 3 :

https://public.tableau.com/views/GLOBALAIRTRANSPORTATIONDashboard3/Das
hboard3?:language=en-US&publish=yes&:display_count=n&:origin=viz_share_link

URL FOR DASHBOARD 4 :

ouhttps://public.tableau.com/views/GLOBALAIRTRANSPORTATIONDashboard4/D
ashboard4?:language=en-US&:display_cnt=n&:origin=viz_share_link

URL FOR STORY :

https://public.tableau.com/views/Globalairtransportationnetwork_16964960195
700/Story1?:language=en-US&:display_count=n&:origin=viz_share_link