SRI LANKA INSTITUE OF INFORMATION TECHNOLOGY
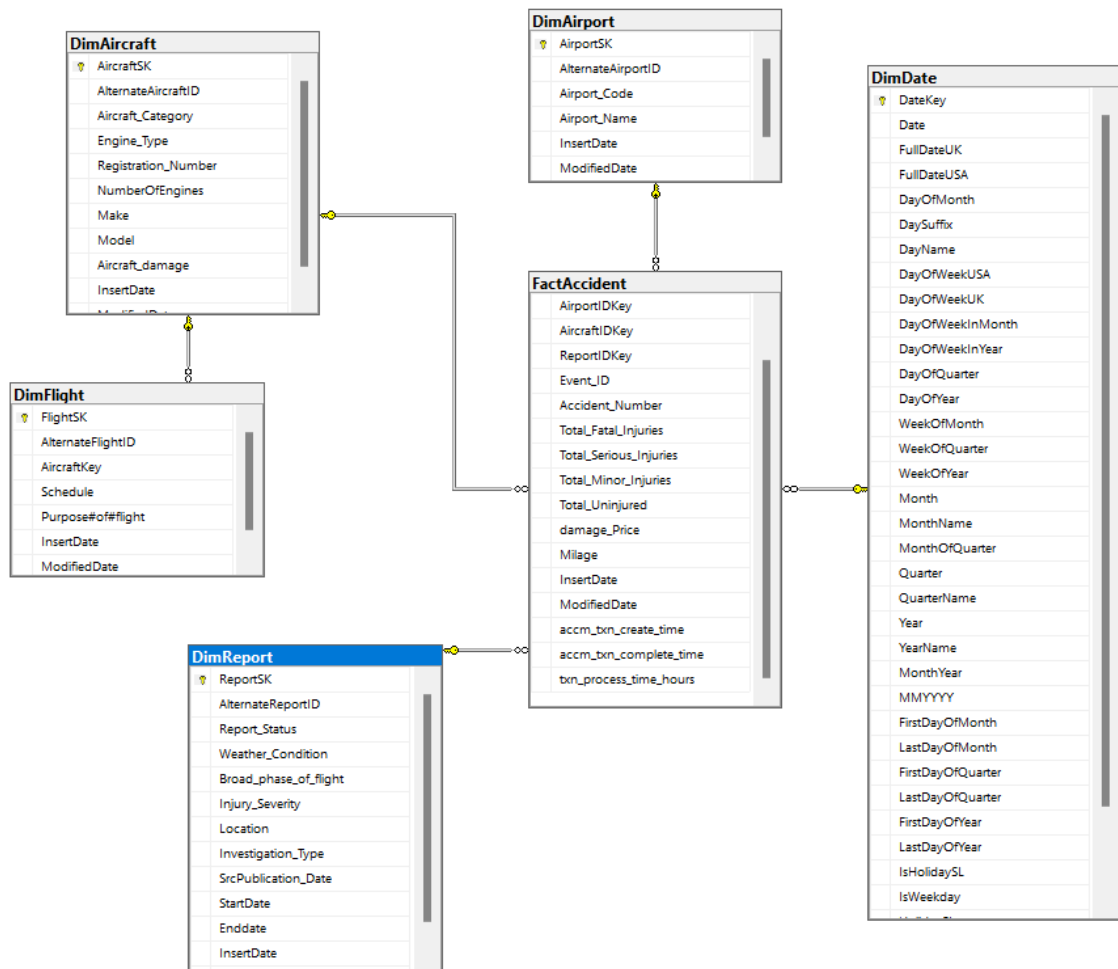

ID No:	**IT20067342**
Name:	**Jayasuriya J.A.D.A.S**
Batch: DS weekday	**Assignment: 02**

Step 1: Data source

Data warehouse designed at the Assignment I is used as the data source for this assignment. Data warehouse consists of 6 dimension tables and one fact tables to represent Accident data altogether.
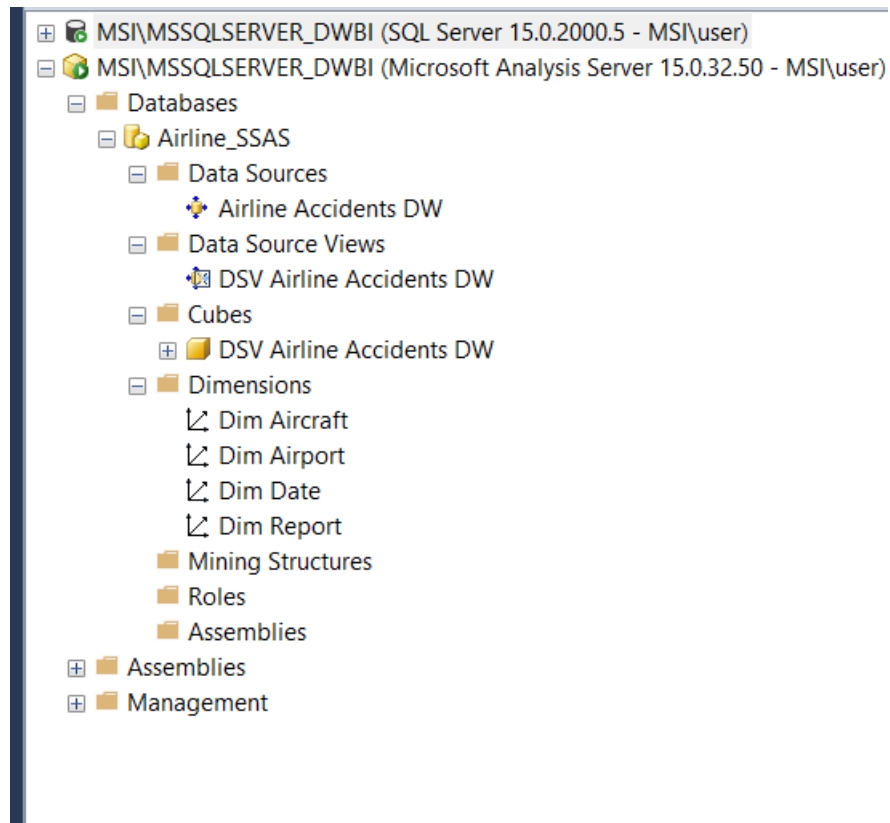
ER Diagram for the source system

DimAircraft
- 🔑 AircraftSK
- AlternateAircraftID
- Aircraft_Category
- Engine_Type
- Registration_Number
- NumberOfEngines
- Make
- Model
- Aircraft_damage
- InsertDate

DimAirport
- 🔑 AirportSK
- AlternateAirportID
- Airport_Code
- Airport_Name
- InsertDate
- ModifiedDate

DimDate
- 🔑 DateKey
- Date
- FullDateUK
- FullDateUSA
- DayOfMonth
- DaySuffix
- DayName
- DayOfWeekUSA
- DayOfWeekUK
- DayOfWeekInMonth
- DayOfWeekInYear
- DayOfQuarter
- DayOfYear
- WeekOfMonth
- WeekOfQuarter
- WeekOfYear
- Month
- MonthName
- MonthOfQuarter
- Quarter
- QuarterName
- Year
- YearName
- MonthYear
- MMYYYY
- FirstDayOfMonth
- LastDayOfMonth
- FirstDayOfQuarter
- LastDayOfQuarter
- FirstDayOfYear
- LastDayOfYear
- IsHolidaySL
- IsWeekday

DimFlight
- 🔑 FlightSK
- AlternateFlightID
- AircraftKey
- Schedule
- Purpose#of#flight
- InsertDate
- ModifiedDate

FactAccident
- AirportIDKey
- AircraftIDKey
- ReportIDKey
- Event_ID
- Accident_Number
- Total_Fatal_Injuries
- Total_Serious_Injuries
- Total_Minor_Injuries
- Total_Uninjured
- damage_Price
- Milage
- InsertDate
- ModifiedDate
- accm_txn_create_time
- accm_txn_complete_time
- txn_process_time_hours

DimReport
- 🔑 ReportSK
- AlternateReportID
- Report_Status
- Weather_Condition
- Broad_phase_of_flight
- Injury_Severity
- Location
- Investigation_Type
- SrcPublication_Date
- StartDate
- Enddate
- InsertDate

Step 2: SSAS Cube implementation

SSAS cube implementation is followed with several steps.

## I.   Project creation

SSAS project is created in Visual studio for the Airline Accident data in data warehouse. The project is renamed to Airline_SSAS

II.   Data Sources Configuration

In the created project, data source folder is selected under the Airline_SSAS package. After creating a connection to the MS SQL server, 'DataWarehouse' database in sql server has been selected as the data source.

III.   Data Source View Configuration

In the Data Source View Wizard, configured data source has been selected. Then the necessary tables and views required for cube design has been selected as shown below.
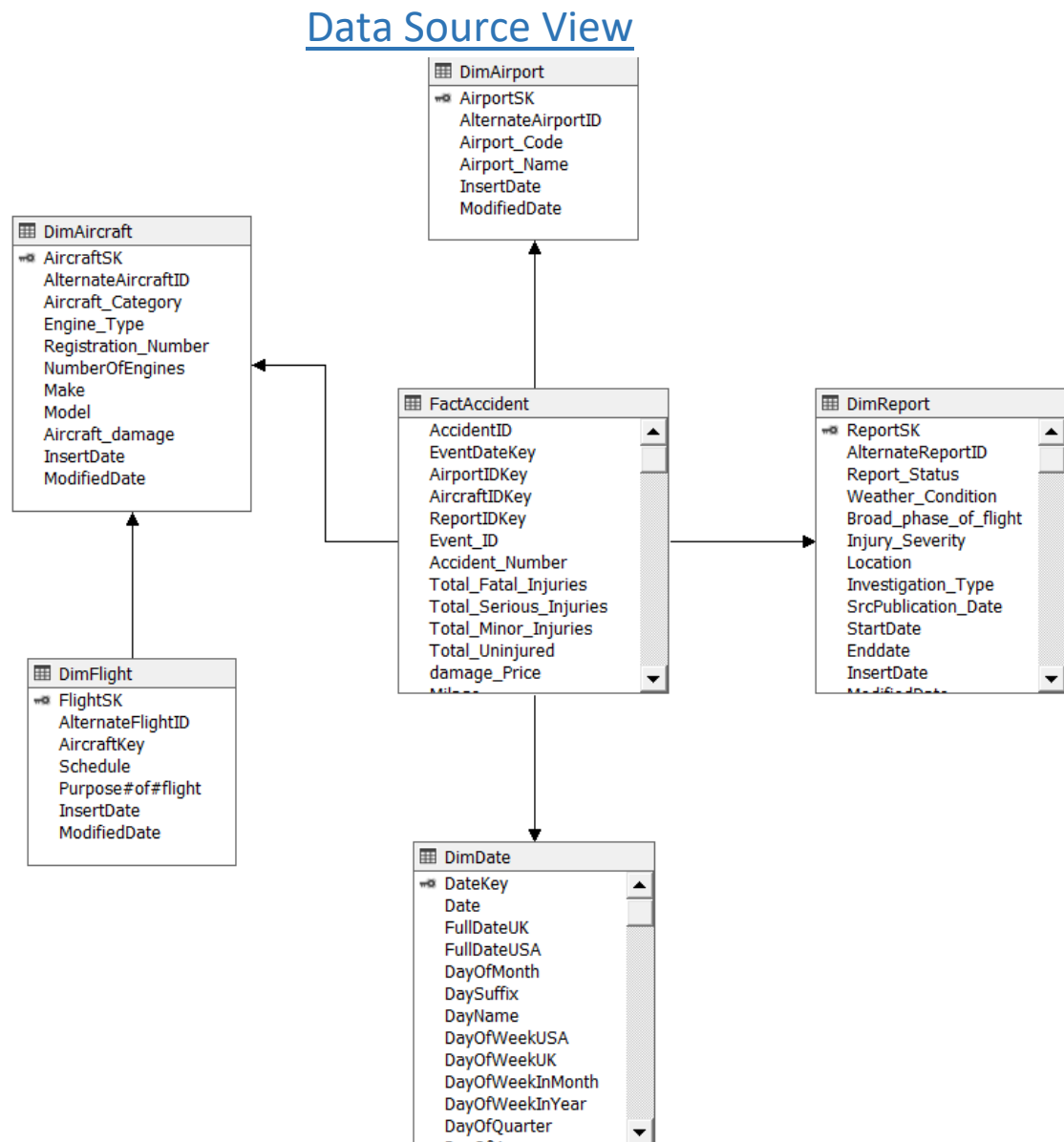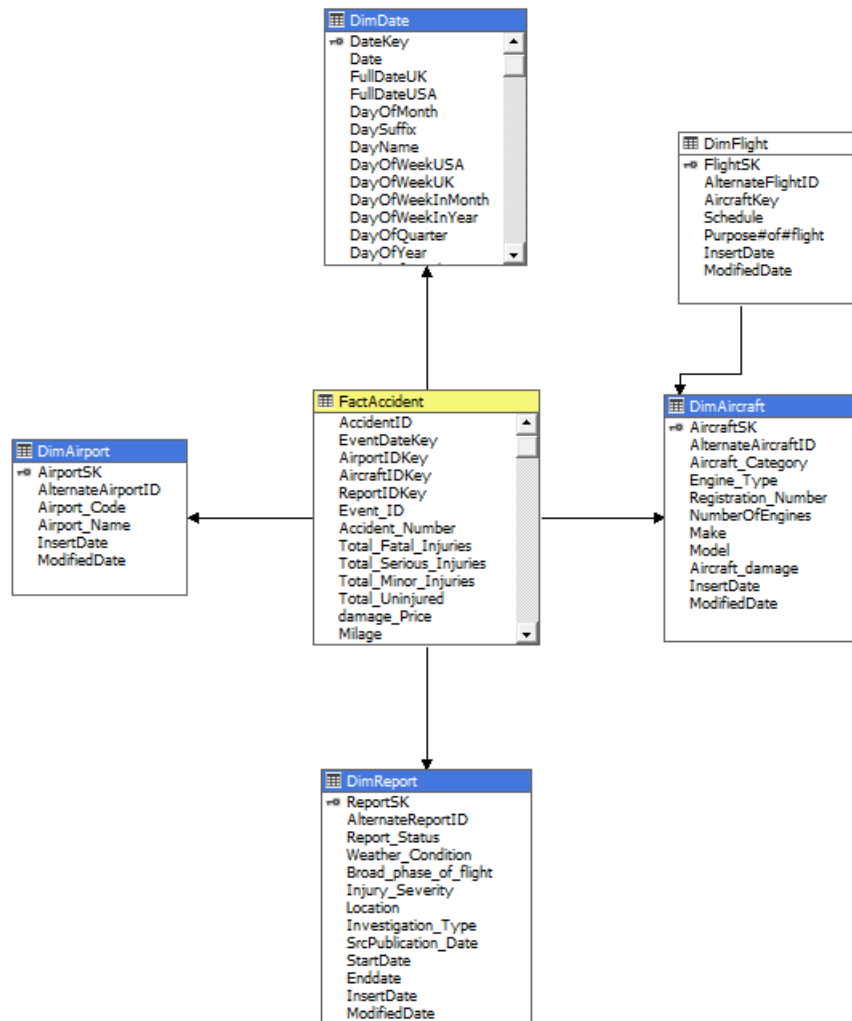
Data Source View

Data source view has been configured with its relevant tables as per the above design.

IV.   Cube Design

In the Cube wizard FactAccident has been selected as the Measure table and DimAircraft, DimAirport, DimReport, DimFlight as dimension tables for the cube.

Using measures and dimensions Cube is designed as below.

Cube Design

DimDate
- ⚷ DateKey
- Date
- FullDateUK
- FullDateUSA
- DayOfMonth
- DaySuffix
- DayName
- DayOfWeekUSA
- DayOfWeekUK
- DayOfWeekInMonth
- DayOfWeekInYear
- DayOfQuarter
- DayOfYear

DimFlight
- ⚷ FlightSK
- AlternateFlightID
- AircraftKey
- Schedule
- Purpose#of#flight
- InsertDate
- ModifiedDate

FactAccident
- AccidentID
- EventDateKey
- AirportIDKey
- AircraftIDKey
- ReportIDKey
- Event_ID
- Accident_Number
- Total_Fatal_Injuries
- Total_Serious_Injuries
- Total_Minor_Injuries
- Total_Uninjured
- damage_Price
- Milage

DimAircraft
- ⚷ AircraftSK
- AlternateAircraftID
- Aircraft_Category
- Engine_Type
- Registration_Number
- NumberOfEngines
- Make
- Model
- Aircraft_damage
- InsertDate
- ModifiedDate

DimAirport
- ⚷ AirportSK
- AlternateAirportID
- Airport_Code
- Airport_Name
- InsertDate
- ModifiedDate

DimReport
- ⚷ ReportSK
- AlternateReportID
- Report_Status
- Weather_Condition
- Broad_phase_of_flight
- Injury_Severity
- Location
- Investigation_Type
- SrcPublication_Date
- StartDate
- Enddate
- InsertDate
- ModifiedDate

V. Cube Implementation

→ Implementing Hierarchies

→ I.Hierarchies on DimDate

Then the SSAS was deployed in MSSQL server management studio. The deployed data cube contains the fact transaction measure table with Dim Report, Dim Airport , Dim Date, Dim Aircraft tables dimension tables.

```
⊟ ▶ Command
  ⊟ 🗐 Processing Database 'Airline_SSAS' completed.
    ⊞ 🖉 Processing Dimension 'Dim Aircraft' completed.
    ⊞ 🖉 Processing Dimension 'Dim Airport' completed.
    ⊞ 🖉 Processing Dimension 'Dim Date' completed.
    ⊞ 🖉 Processing Dimension 'Dim Report' completed.
    ⊟ ⬡ Processing Cube 'DSV Airline Accidents DW' completed.
        🕓 Start time: 5/17/2022 4:48:46 PM; End time: 5/17/2022 4:48:47 PM; Duration: 0:00:00
      ⊞ ᴵᴵᴵ Processing Measure Group 'Fact Accident' completed.
    🕓 Start time: 5/17/2022 4:48:46 PM; End time: 5/17/2022 4:48:47 PM; Duration: 0:00:00
```

KPI Creation

KPI is designed on damagePrice attribute of Measures. It checks if the estimated damage cost is more than $5000.If so value is set to success(True) else set to fail(False).

Name:

KPI Total damage price

Associated measure group:

Fact Accident

≫ Value Expression

```
[Measures].[Damage Price]
```

≫ Goal Expression

```
[Measures].[Damage Price]>5000
```

≫ Status

Status indicator: 🔺 Gauge

Status expression:

≫ Trend

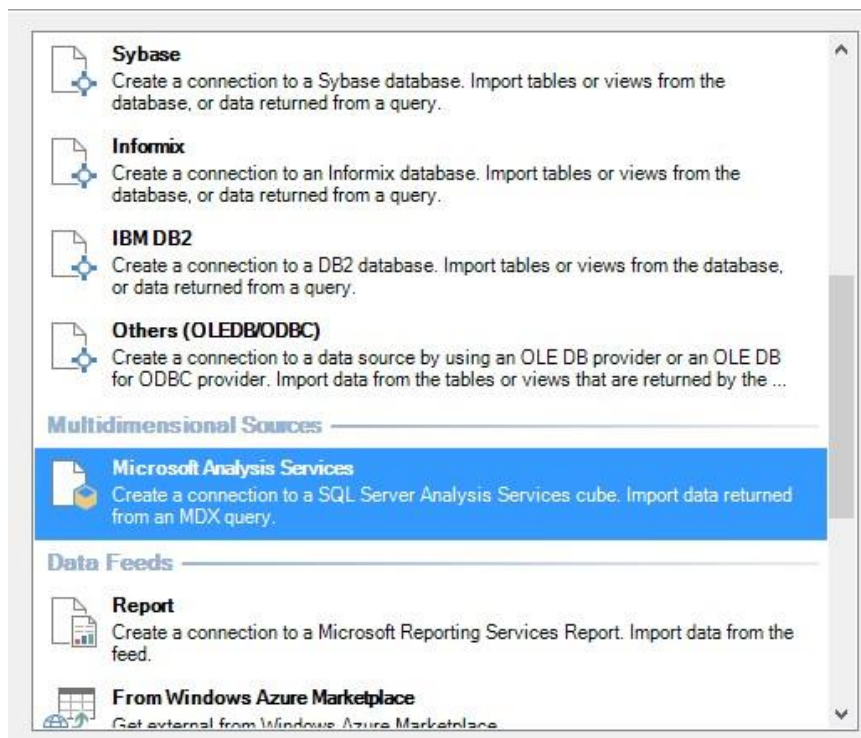Trend indicator: ⬆ Status arrow

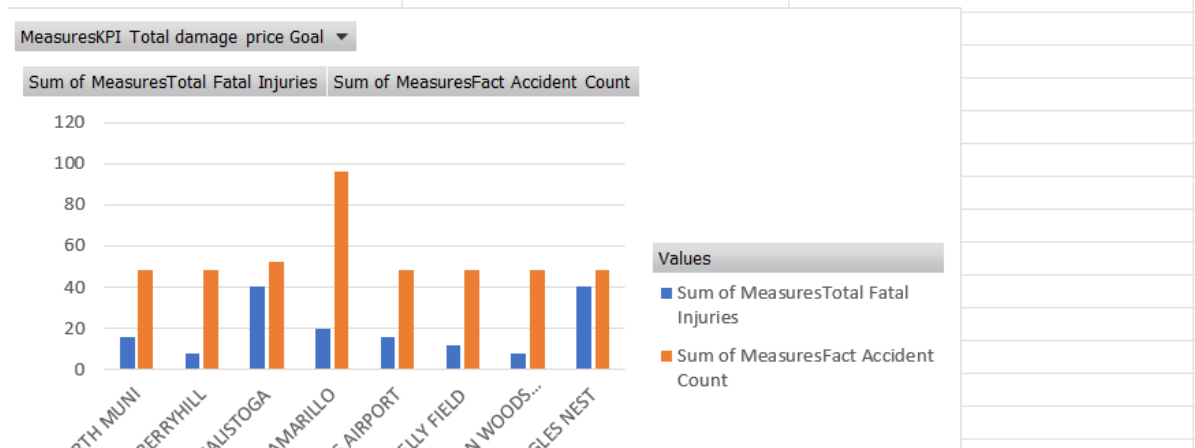Trend expression:

Step 3: SSAS Cube implementation

In the data tab of excel Microsoft analysis services are selected from other sources. There the relevant database to create the pivot table
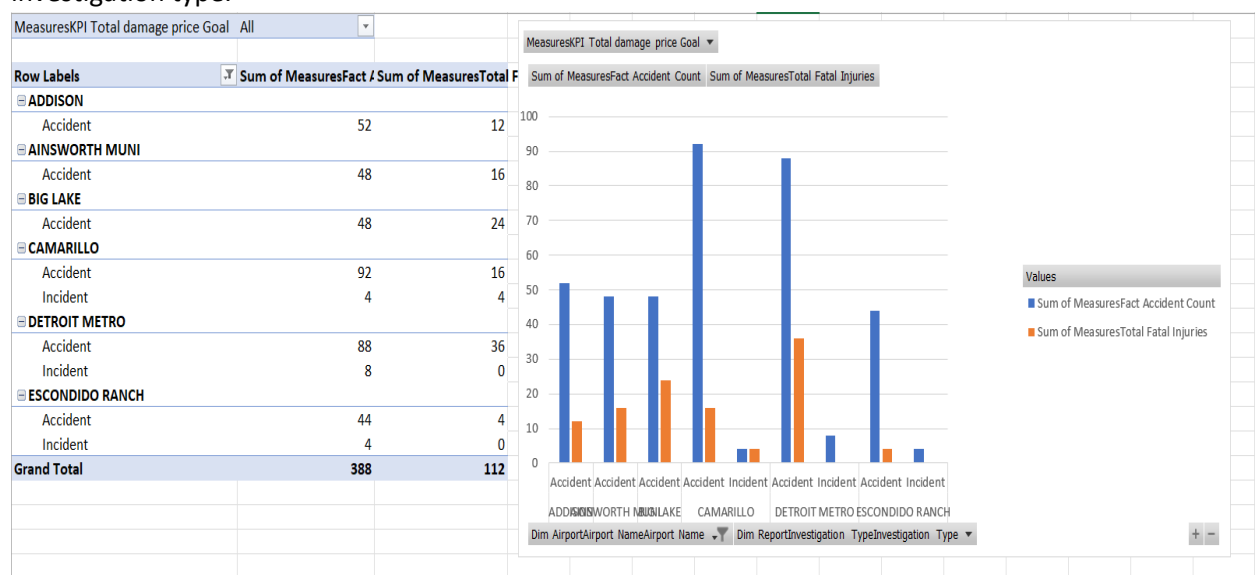
I.   Roll-Up

It can be seen about total amount of fatal injured passengers of each accidents and total accident count of the relevant airport. Category by Airport name.

MeasuresKPI Total damage price Goal	All	⌄

Row Labels ⛕	Sum of MeasuresTotal Fatal Injuries	Sum of MeasuresFact Accident Count
AINSWORTH MUNI	16	48
BERRYHILL	8	48
CALISTOGA	40	52
CAMARILLO	20	96
DALLAS AIRPORT	16	48
DANNELLY FIELD	12	48
E.W.COTTON WOODS MEMORIAL	8	48
EAGLES NEST	40	48
Grand Total	**160**	**436**

MeasuresKPI Total damage price Goal ▾

Sum of MeasuresTotal Fatal Injuries — Sum of MeasuresFact Accident Count

Values
- Sum of MeasuresTotal Fatal Injuries
- Sum of MeasuresFact Accident Count

II. Drill-Down

In this graphs represent the total count of Accidents and total count od fatally injured passengers. According to the Airport. And also airport has child category called Accident_Type which describe the investigation type.

MeasuresKPI Total damage price Goal	All	▾

Row Labels ⛕	Sum of MeasuresFact /	Sum of MeasuresTotal F
⊟ ADDISON		
Accident	52	12
⊟ AINSWORTH MUNI		
Accident	48	16
⊟ BIG LAKE		
Accident	48	24
⊟ CAMARILLO		
Accident	92	16
Incident	4	4
⊟ DETROIT METRO		
Accident	88	36
Incident	8	0
⊟ ESCONDIDO RANCH		
Accident	44	4
Incident	4	0
Grand Total	**388**	**112**

MeasuresKPI Total damage price Goal ▾

Sum of MeasuresFact Accident Count — Sum of MeasuresTotal Fatal Injuries

Values
- Sum of MeasuresFact Accident Count
- Sum of MeasuresTotal Fatal Injuries

Dim AirportAirport NameAirport Name ▾   Dim ReportInvestigation TypeInvestigation Type ▾

III. Slice

We can get count of Accidents and count of totally injured persons according to the Investigation_Type.

MeasuresKPI Total damage price Goal	All

Sum of MeasuresFact Accident Count	Sum of MeasuresTotal Fatal Injuries
40452	15492
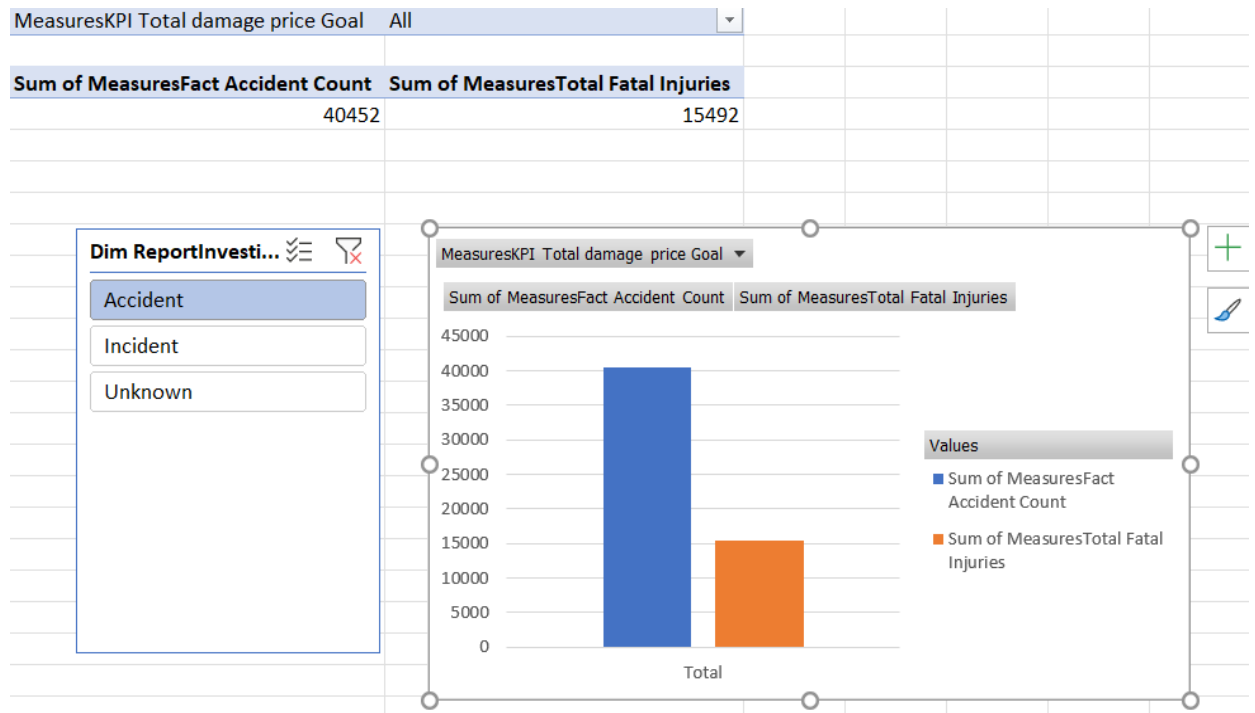
IV. Dice

a new column-wise which is called Airport Name categorization is introduced so that values can be filtered in two dimensions.

MeasuresKPI Total damage price Goal	All

Sum of MeasuresFact Accident Count	Sum of MeasuresTotal Fatal Injuries
48	28
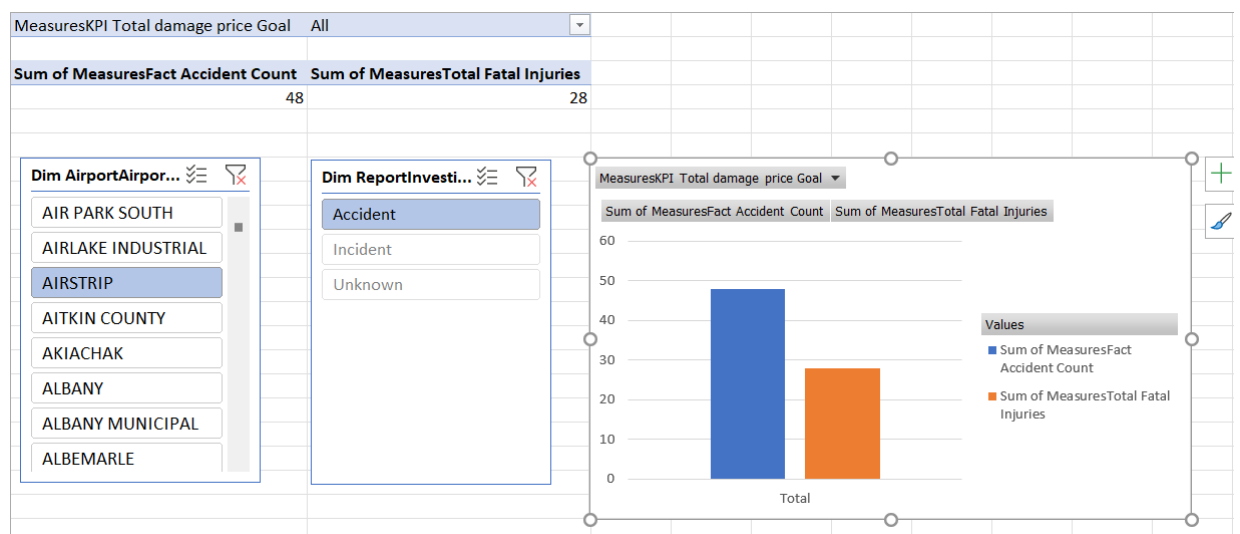
Step 4: SSRS Reports

I.　Report 1: Report with a matrix

Airport_MatrixReport

Airport	[Year]			Total		
	Total Fatal In	Total Serious	Total Minor I	Total Fatal In	Total Serious	Total Minor I
[Airport_Name]	[Sum(Total_Fat	[Sum(Total_Ser	[Sum(Total_Mir	[Sum(Total_Fa	[Sum(Total_Se	[Sum(Total_M
Total		[Sum(Total_Fa	[Sum(Total_Se	[Sum(Total_M	[Sum(Total_Fa	[Sum(Total_Se	[Sum(Total_M

[&ExecutionTime]

Airport_MatrixReport

Airport Name	1982			1983			1984			Total		
	Total Fatal Injuries	Total Serious Injuries	Total Minor Injuries	Total Fatal Injuries	Total Serious Injuries	Total Minor Injuries	Total Fatal Injuries	Total Serious Injuries	Total Minor Injuries	Total Fatal Injuries	Total Serious Injuries	Total Minor Injuries
	12	0	0	0	0	8	4	4	0	16	4	8
34TH	4	0	16	0	4	0	0	4	4	4	8	20
7M RANCH	8	0	4	4	24	28	4	4	8	16	28	40
ABANDONED STRIP	4	0	8	4	0	4	0	0	8	8	0	20
ABILENE	24	0	8	0	0	0	0	0	4	24	0	12
ACME	4	0	0	12	4	0	4	12	4	20	16	4
ADA MUNICIPAL	0	8	0	28	0	0	16	8	20	44	16	20
ADDISON	0	8	12	12	4	8	0	0	0	12	12	20
AERO VALLEY	20	0	4	8	0	8	0	0	0	28	0	12
AG STRIP	0	0	0	0	12	4	20	4	0	20	16	4
AINSWORTH MUNI	8	4	8	8	0	0	0	12	16	16	16	24
AIR HARBOR	20	0	4	28	4	4	0	0	8	48	4	16
AIR PARK SOUTH	0	0	8	0	0	4	8	0	16	8	0	28
AIRLAKE INDUSTRIAL	12	0	0	8	0	0	8	12	4	28	12	4
AIRSTRIP	24	0	0	0	4	0	4	12	4	28	16	4
AITKIN	20	16	0	12	0	0	4	0	8	36	16	8

II.　Report 2: SSRS drill-down report

Accident_drilldownReport

Year	Month Name	damage Price	Total Uninjured
[Year]	[MonthName]	[damage_Price]	[Total_Uninjure

[&ExecutionTime]

Accident_drilldownReport

Year	Month Name	damage Price	Total Uninjured
⊞ 1982	January	43900	4
⊞ 1983	January	27588	2
⊞ 1984	May	39398	2

IV.   Report 3: SSRS drill-through report

New Table or Matrix

Arrange fields

Arrange fields to group data in rows, columns, or both, and choose values to display. Data expands across the page in column groups and down the page in row groups. Use functions such as Sum, Avg, and Count on the fields in the Values box.

Available fields
- Year
- AircraftSK
- AlternateAircraftID
- Aircraft_Category
- FlightSK
- AlternateFlightID
- Schedule
- Purpose_of_flight
- Total_Fatal_Injuries
- Total_Minor_Injuries
- Total_Serious_Injuries
- Total_Uninjured
- damage_Price

Column groups
- Year

Row groups
- Aircraft_Category

Σ Values
- Sum(Total_Fatal_Injuries)
- Sum(Total_Minor_Injuries)
- Sum(Total_Serious_Injuries)

Help   < Back   Next >   Cancel

---

drill-through-level01

[Year]

Aircraft Category	Total Fatal Injuries	Total Minor Injuries	Total Serious Injuries
[Aircraft_Category]	[Sum(Total_Fatal_	[Sum(Total_Minor_	[Sum(Total_Seriou

Chart Title

Legend: Year A, Year B

Categories: Aircraft Category A, Aircraft Category B, Aircraft Category C, Aircraft Category D, Aircraft Category E, Aircraft Category F

---

drill-through-level01

Aircraft Category	1982			1983			1984		
	Total Fatal Injuries	Total Minor Injuries	Total Serious Injuries	Total Fatal Injuries	Total Minor Injuries	Total Serious Injuries	Total Fatal Injuries	Total Minor Injuries	Total Serious Injuries
	672	24	48						
Airplane	4948	3508	2356	5076	4180	2676	4192	3656	2420
Balloon	28	48	96						
Glider	28	24	76				228	220	132
Gyrocraft	8	16	12						
Helicopter	648	372	320	16	12	16	260	168	124
Sea-Plane							0	0	0
Ultralight	4	0	0						
Unknown	4	0	0						

5/20/2022 12:16:01 PM

Chart Title

Legend: 1982, 1983, 1984

Categories: Airplane, Balloon, Glider, Gyrocraft, Helicopter, Sea-Plane, Ultralight, Unknown

Final set of reports: