Tableau Project Structure: AI-Driven EMS Dashboards

This document details the complete structure for the Tableau workbook, organized by data sources and the three core dashboards.

1. Overall Project Organization

To maintain clarity within the Tableau workbook, use a consistent naming convention and folder structure.

- **Naming Convention:**
  - **Worksheets:** `[Dashboard #] - [Chart Name]` (e.g., `D1 - Live Fleet Map`, `D2 - Response Time Trend`)
  - **Dashboards:** `[Dashboard #] - [Dashboard Name]` (e.g., `D1 - CommandCenter Live`)
  - **Calculated Fields:** `[Calc] [Field Name]` (e.g., `[Calc] Response Time (sec)`)
- **Folders:** Group calculated fields into folders within the Data pane (e.g., "Time Calculations," "AI Metrics").

2. Data Source Layer

You will connect to three primary data sources.

1. **`tableau.live_fleet_view`**
   - **Purpose:** Powers the real-time operational dashboard.
   - **Connection Type: Live**. This is essential for at-a-glance operational awareness.
   - **Key Fields:** `Unit ID`, `Unit Status`, `Unit Type`, `Latitude`, `Longitude`, `Incident ID`, `Incident Status`, `Location`, `Assigned Units`.
2. **`tableau.kpi_summary_view`**
   - **Purpose:** Powers the historical performance and trend analysis dashboard.
   - **Connection Type: Extract**. Schedule a recurring refresh (e.g., hourly or nightly) for optimal performance.
   - **Key Fields:** `Incident ID`, `Incident Type`, `Call Creation Timestamp`, `Dispatch Timestamp`, `En Route Timestamp`, `On Scene Timestamp`, `District/Zone`, `Time of Day`, `Day of Week`.
3. **`ai_model_results_view`**
   - **Purpose:** Powers the AI model evaluation dashboard.
   - **Connection Type: Extract**. Refresh whenever new model predictions are generated.
   - **Key Fields:** `Incident ID`, `AI Predicted Triage Acuity`, `Actual Patient Outcome`, `Predicted Hotspot (True/False)`, `Actual High-Priority Incident (True/False)`, `Demographic Group`, `Feature Name`, `Feature Importance Score`.

3. Dashboard 1: CommandCenter Live (Operational)

Objective: Provide a real-time overview for Dispatch Supervisors.

- **Calculated Fields:**
  - Generally not needed, as this dashboard reflects raw, live data.
- **Worksheets:**
  - **`D1 - Live Fleet Map`**:
    - **Type:** Map
    - **Columns:** `Longitude`
    - **Rows:** `Latitude`
    - **Marks:** `Unit ID` on Detail, `Unit Status` on Color, `Unit Type` on Shape. Tooltip shows key unit details.
  - **`D1 - KPI Active Incidents`**:
    - **Type:** Text
    - **Marks:** `COUNTD(Incident ID)` on Text.
    - **Filter:** `Incident Status` to include only active states.
  - **`D1 - KPI Available Units`**:
    - **Type:** Text
    - **Marks:** `COUNTD(Unit ID)` on Text.
    - **Filter:** `Unit Status` = 'Available'.
  - **`D1 - Active Incidents List`**:
    - **Type:** Text Table
    - **Rows:** `Incident Type`, `Location`, `Assigned Unit(s)`.
    - **Filter:** Apply the same `Incident Status` filter from the KPI worksheet.
  - **`D1 - Unit Status Summary`**:
    - **Type:** Bar Chart
    - **Columns:** `Unit Status`.
    - **Rows:** `COUNTD(Unit ID)`.
    - **Marks:** `Unit Status` on Color to match the map.
- **Dashboard Assembly (`D1 - CommandCenter Live`):**
  - Arrange KPIs in a horizontal container at the top.
  - Place the Live Fleet Map in the main central area.
  - Place the Active Incidents List and Unit Status Summary on the right or bottom.
  - **Interactivity:** No filters needed; this is a pure monitoring tool.

4. Dashboard 2: Performance & Response Time Analysis (Strategic)

Objective: Analyze historical trends for Command Staff.

- **Calculated Fields:**
  - **`[Calc] Response Time (sec)`**: `DATEDIFF('second', [Call Creation Timestamp], [On Scene Timestamp])`
  - **`[Calc] Call-to-Dispatch (sec)`**: `DATEDIFF('second', [Call Creation Timestamp], [Dispatch Timestamp])`
  - **`[Calc] Turnout Time (sec)`**: `DATEDIFF('second', [Dispatch Timestamp], [En Route Timestamp])`

- **Worksheets:**
  - **`D2 - Response Time Trend`**:
    - **Type:** Line Chart
    - **Columns:** Continuous `MONTH(Call Creation Timestamp)`.
    - **Rows:** `AVG([Calc] Response Time (sec))`.
  - **`D2 - KPIs`**:
    - **Type:** Text
    - Create separate worksheets for `AVG([Calc] Response Time (sec))`, `AVG([Calc] Call-to-Dispatch (sec))`, and `AVG([Calc] Turnout Time (sec))`.
  - **`D2 - Response Time by District`**:
    - **Type:** Map or Bar Chart
    - **Map:** `District/Zone` on Detail, `AVG([Calc] Response Time (sec))` on Color.
    - **Bar Chart:** `District/Zone` on Columns, `AVG([Calc] Response Time (sec))` on Rows.
  - **`D2 - Incident Heatmap`**:
    - **Type:** Density Map
    - **Columns/Rows:** `Longitude` / `Latitude`.
    - **Marks:** `COUNTD(Incident ID)` on Color/Intensity.
- **Dashboard Assembly (`D2 - Performance & Response Analysis`):**
  - **Filters (Show on Dashboard):** `Call Creation Timestamp` (as a date range), `Incident Type`, `Time of Day`, `Day of Week`. Apply these to all worksheets on the dashboard.
  - **Interactivity:**
    - Create a **Filter Action** where clicking on a district in the `Response Time by District` map filters the entire dashboard to that specific district.

5. Dashboard 3: AI Model Performance (Analytical)

Objective: Monitor model accuracy and fairness for Data Scientists.

- **Calculated Fields:**
  - **`[Calc] Is Correct Triage`**: `IF [AI Predicted Triage Acuity] = [Actual Patient Outcome] THEN 1 ELSE 0 END`
  - **`[Calc] Triage Accuracy`**: `SUM([Is Correct Triage]) / COUNTD([Incident ID])`
  - **`[Calc] Hotspot Hit`**: `IF [Predicted Hotspot (True/False)] = TRUE AND [Actual High-Priority Incident (True/False)] = TRUE THEN 1 ELSE 0 END`
  - **`[Calc] Hotspot Hit Rate`**: `SUM([Hotspot Hit]) / SUM(IF [Actual High-Priority Incident (True/False)] = TRUE THEN 1 ELSE 0 END)`
- **Worksheets:**
  - **`D3 - Triage Confusion Matrix`**:
    - **Type:** Highlight Table
    - **Columns:** `AI Predicted Triage Acuity`.
    - **Rows:** `Actual Patient Outcome`.
    - **Marks:** `COUNTD(Incident ID)` on Color and Label.
  - **`D3 - KPIs`**:
    - **Type:** Text
    - Create separate worksheets for `[Calc] Triage Accuracy` and `[Calc] Hotspot Hit Rate`. Format as percentages.
  - **`D3 - Bias Analysis`**:
    - **Type:** Bar Chart
    - **Columns:** `Demographic Group`.
    - **Rows:** `[Calc] Triage Accuracy`. This will reveal if accuracy varies across different groups.
  - **`D3 - Feature Importance`**:
    - **Type:** Bar Chart
    - **Columns:** `SUM(Feature Importance Score)`.
    - **Rows:** `Feature Name`. Sort descending.
- **Dashboard Assembly (`D3 - AI Model Performance`):**
  - **Filters (Show on Dashboard):** `Date of Prediction`, `AI Model Version` (if applicable).
  - **Interactivity:** Clicking a cell in the `Triage Confusion Matrix` could filter a detailed list of those specific incidents (requires an additional worksheet not listed above).

STEP BY STEP GUIDE -

Live Fleet Map, which is the first and most important worksheet for the CommandCenter Live dashboard.

Prerequisites

- You have Tableau Desktop open.
- You have successfully connected to your `tableau.live_fleet_view` data source.
- The connection is set to **Live**.
- You are on a new, blank worksheet.

Step-by-Step Guide: Creating the Live Fleet Map

Step 1: Rename the Worksheet

1. At the bottom of the screen, double-click the tab that says "Sheet 1".
2. Rename it to **D1 - Live Fleet Map** and press Enter. This keeps your project organized.

Step 2: Create the Basic Map

1. In the **Data** pane on the left, locate your geographical fields.
2. Drag the **Longitude** field and drop it onto the **Columns** shelf at the top of the screen.
3. Drag the **Latitude** field and drop it onto the **Rows** shelf.

- **Result:** A world map will appear with a single point. Tableau is now ready to plot your geographic data.

Step 3: Plot Individual Units

1. From the Data pane, find the **Unit ID** dimension.
2. Drag **Unit ID** and drop it onto the **Detail** property on the **Marks card**. The Marks card is the box to the left of your map view.

- **Result:** The single point will now split into multiple points, one for each unique Unit ID in your data source. You are now seeing every unit in your fleet.

Step 4: Color-Code Units by Status

1. From the Data pane, find the **Unit Status** dimension.
2. Drag **Unit Status** and drop it onto the **Color** property on the Marks card.
3. Tableau will automatically assign colors. To customize them, click the **Color** property, then select **Edit Colors...**.
4. In the dialog box, select each status one by one and assign the correct color:
    - Click on **"Available"** -> Select a bright **green**.
    - Click on **"En Route"** -> Select a bright **yellow**.
    - Click on **"On Scene"** -> Select a bright **blue**.
    - Click on **"Transporting"** -> Select a bright **purple**.
5. Click **OK**.

- **Result:** Your map points are now color-coded, providing an at-a-glance view of what each unit is doing.

Step 5: (Optional but Recommended) Use Shapes for Unit Type

1. From the Data pane, find the **Unit Type** dimension.
2. Drag **Unit Type** and drop it onto the **Shape** property on the Marks card.
3. Tableau will assign default shapes. To customize them, click the **Shape** property.
4. In the dialog box, you can assign a unique shape for each Unit Type (e.g., a circle for BLS, a square for ALS, a plus sign for Fire Engines).

- **Result:** You can now distinguish between different vehicle types just by looking at the map.

Step 6: Clean Up the Tooltip

The tooltip is the information box that appears when you hover over a data point. Let's make it clean and useful.

1. Click the **Tooltip** property on the Marks card. An editor window will pop up.
2. Delete the existing text and type in your own structure. You can insert data fields using the "Insert" button. A good format is:

```
Unit: <Unit ID>
Status: <Unit Status>
Type: <Unit Type>
```

3. Click **OK**.

You have now successfully created the **Live Fleet Map**. It is a dynamic, real-time visualization showing the location, status, and type of every unit in your fleet, ready to be placed on your final dashboard.

Worksheet 2: KPI - Active Incidents.

This worksheet is designed to be a "Big Number" display that shows a single, crucial metric for immediate understanding.

Prerequisites

- You are in the same Tableau workbook where you created the "Live Fleet Map".
- You are connected to the `tableau.live_fleet_view` data source with a **Live** connection.

Step-by-Step Guide: Creating the "KPI - Active Incidents" Worksheet

Step 1: Create and Rename the New Worksheet

1. At the bottom of the Tableau window, click the **"New Worksheet"** icon (it looks like a small bar chart with a plus sign).
2. A new blank sheet will open. Double-click its tab, which likely says "Sheet 2".

3. Rename it to **D1 - KPI Active Incidents** and press Enter.

Step 2: Display the Count of Incidents

1. From the **Data** pane on the left, find the **Incident ID** dimension.
2. Drag **Incident ID** and drop it directly onto the **Text** property on the **Marks card**.

- **Result:** You will see a number appear in the view. However, this number is likely incorrect because Tableau defaults to a simple count or sum. We need a *distinct count*.

3. On the Marks card, you will see a green pill labeled something like `CNTD(Incident ID)`. Right-click on this pill.
4. Go to **Measure** -> **Count (Distinct)**. This is very important. It ensures that if an incident has multiple units assigned (and thus multiple rows in the data), it is only counted once.

Step 3: Filter for ONLY Active Incidents

Now, we'll filter the view to exclude incidents that are already closed.

1. From the Data pane, find the **Incident Status** dimension.
2. Drag **Incident Status** and drop it onto the **Filters** shelf (located just above the Marks card).
3. A filter dialog box will appear, listing all possible statuses. Check the boxes for all statuses that you consider "active". This typically includes:
    - `Dispatched`
    - `En Route`
    - `On Scene`
    - `Transporting`
    - (Do **not** check `Closed`, `Cleared`, or `Available`)
4. Click **OK**.

- **Result:** The number in your view will update to show only the count of incidents that are currently ongoing.

Step 4: Format the KPI for High Visibility

Let's make the number big and easy to read from a distance.

1. Click on the **Text** property on the Marks card. An editor window will pop up.
2. Click the **...** button to open the full text editor.
3. Inside the editor, you'll see something like `<CNTD(Incident ID)>`. You can add text directly around it. Change the text to look like this:

```
Active Incidents
<CNTD(Incident ID)>
```

4.
5.
6. Highlight all the text in the editor.
7. Use the formatting options at the top of the editor to:
    - Change the **Font Size** to **24pt** or larger.
    - Make the text **Bold**.
    - Set the **Alignment** to **Center**.
8. Click **OK**.

Step 5: Final View Adjustment

1. In the main toolbar, find the dropdown that says "Standard".

2. Click it and change the view to **"Entire View"**. This will ensure your large number is perfectly centered in the worksheet frame.

You have now successfully created the **"KPI - Active Incidents"** worksheet. It is a clear, auto-updating display of a critical metric, ready to be placed on your final CommandCenter Live dashboard.

Worksheet 3: KPI - Available Units.

This worksheet is the second "Big Number" display for your dashboard, showing how many units are ready to be dispatched.

Prerequisites

- You are in the same Tableau workbook as the previous worksheets.
- You are connected to the `tableau.live_fleet_view` data source with a **Live** connection.

Step-by-Step Guide: Creating the "KPI - Available Units" Worksheet

Step 1: Create and Rename the New Worksheet

1. Click the **"New Worksheet"** icon at the bottom of the window.
2. Double-click the new sheet's tab.
3. Rename it to **D1 - KPI Available Units** and press Enter.

Step 2: Display the Count of Units

1. From the **Data** pane on the left, find the **Unit ID** dimension.
2. Drag **Unit ID** and drop it onto the **Text** property on the **Marks card**.
3. Right-click the Unit ID pill that just appeared on the Marks card.
4. Go to **Measure** -> **Count (Distinct)**. This ensures you are counting each unit only once.

Step 3: Filter for ONLY Available Units

This is the key step that makes this worksheet different from the "Active Incidents" KPI.

1. From the Data pane, find the **Unit Status** dimension.
2. Drag **Unit Status** and drop it onto the **Filters** shelf.
3. A filter dialog box will appear. Uncheck all boxes, then check **only** the box for **"Available"**.
4. Click **OK**.

○ **Result:** The number in your view will now show the exact count of units whose current status is "Available".

Step 4: Format the KPI for High Visibility

1. Click on the **Text** property on the Marks card, then click the **...** button to open the text editor.
2. Format the text to give it a clear title. For example:
   Available Units
   <CNTD(Unit ID)>
3.
4.
5. Highlight all the text in the editor.
6. Use the formatting tools to:
   - Change the **Font Size** to **24pt** or larger.
   - Make the text **Bold**.
   - Set the **Alignment** to **Center**.
7. Click **OK**.

Step 5: Final View Adjustment

1. In the toolbar at the top, change the view dropdown from "Standard" to **"Entire View"**. This centers your KPI perfectly within the worksheet's frame.

Worksheet 4: Active Incidents List.

This worksheet acts as a detailed log, providing the specific context behind the "Active Incidents" KPI number.

Prerequisites

- You are in the same Tableau workbook as the previous worksheets.
- You are connected to the tableau.live_fleet_view data source with a **Live** connection.
- You have already created the "D1 - KPI Active Incidents" worksheet and its associated filter.

Step-by-Step Guide: Creating the "Active Incidents List" Worksheet

Step 1: Create and Rename the New Worksheet

1. Click the **"New Worksheet"** icon at the bottom of the window.
2. Double-click the new sheet's tab.
3. Rename it to **D1 - Active Incidents List** and press Enter.

Step 2: Build the Text Table

This worksheet is a simple table, so we will only use the Rows shelf.

1. From the **Data** pane on the left, find the **Incident Type** dimension. Drag it and drop it onto the **Rows** shelf.
2. Find the **Location** dimension. Drag it and drop it onto the **Rows** shelf, placing it to the right of Incident Type.
3. Find the **Assigned Unit(s)** dimension. Drag it and drop it onto the **Rows** shelf, to the right of Location.
    - **Result:** You will now see a text table with columns for Incident Type, Location, and Assigned Unit(s). It currently shows all incidents in your data source.

Step 3: Filter for ONLY Active Incidents

We will reuse the filter we already created for the KPI to ensure consistency.

1. Navigate back to your **"D1 - KPI Active Incidents"** worksheet.
2. In the **Filters** shelf, you will see the Incident Status filter. Right-click on it.
3. From the context menu, select **"Apply to Worksheets"** -> **"Selected Worksheets..."**.
4. A dialog box will appear listing all the worksheets in your workbook. Check the box next to **"D1 - Active Incidents List"**.
5. Click **OK**.
    - **Result:** The list will now automatically be filtered to show only the incidents that are currently active, perfectly matching the KPI count. Any changes to the original filter will now apply to both worksheets.

Step 4: Format the List for Readability

1. In the view, you'll see the table headers. Hover your mouse over the border between the column headers (e.g., between "Incident Type" and "Location").
2. Your cursor will change to a resizing icon. Click and drag to adjust the column widths so that all the text is easily visible without being cut off.
3. In the toolbar, change the view dropdown from "Standard" to **"Fit Width"**. This ensures the table uses the full space available to it when placed on the dashboard.

Worksheet 5: Unit Status Summary.

This chart provides a quick visual breakdown of how your entire fleet is allocated at any given moment.

Prerequisites

- You are in the same Tableau workbook as the previous worksheets.
- You are connected to the tableau.live_fleet_view data source with a **Live** connection.

Step-by-Step Guide: Creating the "Unit Status Summary" Worksheet

Step 1: Create and Rename the New Worksheet

1. Click the **"New Worksheet"** icon at the bottom of the window.
2. Double-click the new sheet's tab.
3. Rename it to **D1 - Unit Status Summary** and press Enter.

Step 2: Create the Bar Chart

1. From the **Data** pane on the left, find the **Unit Status** dimension. Drag it and drop it onto the **Columns** shelf.
2. Find the **Unit ID** dimension. Drag it and drop it onto the **Rows** shelf.
3. The Unit ID pill on the Rows shelf will likely default to a simple count. Right-click on it, go to **Measure**, and select **Count (Distinct)**.
    - **Result:** You will now see a vertical bar chart, with one bar for each status, showing the number of units in that status.

Step 3: Add Color for Consistency

To make the dashboard intuitive, we will use the same colors for status that we used on the Live Fleet Map.

1. From the Data pane, drag the **Unit Status** dimension again, but this time drop it onto the **Color** property on the **Marks card**.
2. Click the **Color** property and select **"Edit Colors..."**.
3. Assign the same colors you used for the map:
    - Available: **Green**
    - En Route: **Yellow**
    - On Scene: **Blue**
    - Transporting: **Purple**
    - Assign other logical colors for any remaining statuses (e.g., grey for "At Station").
4. Click **OK**.

Step 4: Display the Counts on the Bars

1. In the main Tableau toolbar at the top of the window, find the icon that looks like a small bar chart with a "T" on it (**Show Mark Labels**). Click this button.
    - **Result:** The distinct count of units will now appear on top of or inside each corresponding bar, making the chart easier to read without hovering.

Step 5: Final Formatting

1. Right-click on the title of the Y-axis (which probably says "Count (Distinct) of Unit ID") and select **"Edit Axis..."**. In the Title box, change it to something cleaner, like **"Number of Units"**.
2. Right-click on the worksheet's title ("D1 - Unit Status Summary") and select **"Edit Title..."**. You can make it bold or change the wording to something like **"Current Fleet Status"**.

You have now successfully created the **"Unit Status Summary"** worksheet. All five components for the CommandCenter Live dashboard are complete and ready for assembly. The next and final step is to combine them all into a single dashboard view.

CommandCenter Live Dashboard.

Prerequisites

- You are in your Tableau workbook.
- The five worksheets (D1 - Live Fleet Map, D1 - KPI Active Incidents, D1 - KPI Available Units, D1 - Active Incidents List, and D1 - Unit Status Summary) are complete.

Step-by-Step Guide: Assembling the Dashboard

Step 1: Create and Name the Dashboard

1. At the bottom of the Tableau window, click the **"New Dashboard"** icon (it's the one with four squares).
2. A blank dashboard canvas will appear. In the **Dashboard** pane on the left, double-click the default title "Dashboard 1".
3. Rename it to **D1 - CommandCenter Live**.

Step 2: Set the Dashboard Size

1. In the **Dashboard** pane on the left, under "Size", click the dropdown menu.

2. For a command center monitor, a fixed size is usually best. Select **"Fixed size"** and choose a standard layout like **"Desktop Browser (1000 x 800)"** or a custom size that matches your monitor's resolution. This prevents the dashboard from resizing unexpectedly.

Step 3: Use Layout Containers to Build the Structure

Layout containers are like building blocks that help you organize your dashboard neatly.

1. From the **Objects** section at the bottom left, drag a **Horizontal** container and drop it onto the blank canvas. This will be the header for your KPIs.
2. Drag a **Vertical** container and drop it below the horizontal one. This will hold the rest of your content.

Step 4: Place the Worksheets onto the Canvas

Now, you'll drag your completed worksheets from the "Sheets" list on the left into the layout containers you just created.

1. **Add the KPIs:**
    - Drag **D1 - KPI Active Incidents** into the top **Horizontal** container.
    - Drag **D1 - KPI Available Units** into the same container, to the right of the first KPI. They should now sit side-by-side.
2. **Add the Map:**
    - Drag **D1 - Live Fleet Map** into the large **Vertical** container that is below your KPIs.
3. **Add the Supporting Details:**
    - Drag **D1 - Unit Status Summary** into the same vertical container, placing it *below* the map.
    - Drag **D1 - Active Incidents List** and place it *below* the Unit Status Summary chart.

Step 5: Clean Up and Finalize

Your dashboard is functional, but let's make it look professional.

1. **Remove Redundant Legends:** The map and the summary chart both have a color legend for Unit Status. You only need one. Click on the legend you want to remove (e.g., the one from the summary chart) and click the "X" to remove it from the dashboard.
2. **Adjust Sizing:** Hover your mouse over the borders between the different worksheets on your dashboard. Your cursor will change to a resizing icon. Click and drag to give more space to the map and adjust the sizes of the other elements until the layout looks balanced.
3. **Edit Titles:** Double-click the title of any worksheet on the dashboard to edit it. You can make them shorter and cleaner for the final view (e.g., change "D1 - Unit Status Summary" to just "Unit Status").
4. **Show Dashboard Title:** At the bottom of the **Dashboard** pane on the left, check the box for **"Show dashboard title"**. It will appear at the top. Double-click it to edit the text to something like **"Bengaluru EMS - Live Operations"**.

Final Result

You have now successfully built and assembled the **CommandCenter Live** dashboard. It is a powerful, real-time tool that provides supervisors with:

- An immediate count of **active incidents** and **available units**.

- A **live map** showing the precise location and status of every vehicle.
- A clear **summary** of how the fleet is allocated.
- A detailed **list** of all ongoing incidents.

The next step would be to publish this workbook to your Tableau Server or Tableau Cloud, where it can be accessed by your team in a web browser.