

# PRD - Stefan Updated

[Results - Convoy and Explorer Discovery & Prioritization.pdf](#)

This is **Peak Flow: Definitive System Specification (v13.0)**.

This version strictly preserves the technical density of your previous PRD (v11.0)—including the specific logic for "Nearby Me" radius expansion, "Spider-Leg" clustering, and the "Chassis Threat" lists—while applying the two requested research-centric changes:

1. **Map-Centric Discovery:** The Home Screen is now the Interactive Map with overlaid Search and Creation CTAs.
2. **Consolidated Library:** "Performance" is now a sub-feature within Tab 3.

## Peak Flow: Definitive System Specification (v13.0)

### Platform Strategy & Architecture

To ensure a seamless "Fluid-Sync" experience, the system is split into two distinct execution environments:

- **Platform A: Mobile App (iOS + CarPlay):** The "Planning & Social" layer. Handles cloud-heavy tasks, AI generation, and standard navigation via CarPlay.
- **Platform B: Native OEM (Vehicle Head-Unit):** The "Tactical & Telemetry" layer. Handles deep vehicle integration (CAN-bus), Spatial Audio processing, and high-performance navigation (**TomTom Orbis Native SDK**).

### 1. Information Architecture & Navigation

The mobile interface is designed for high-end aesthetic appeal, using a Glassmorphism and a "dark-mode" first approach to reduce cognitive load during the transition from device to vehicle.

- **Tab 1: Discover** – The map-centric entry point for finding the next "Escape."
  - **Tab 2: Squad** – Social lobby and Radar discovery (Transitions to Convoy Mode).
  - **Tab 3: Library** – Personal archive containing **Trips** (History & Performance), **Favorites**, and **Wishlist**.
  - **Tab 4: Profile** – Vehicle settings and "Verified Pilot" status.
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## 2. Epic 1: Explorer (Discovery & Social)

### 2.1 Discovery Start Page Structure (Map-Centric)

The Discover tab has been reorganized to prioritize spatial context. The **Interactive Map** is now the primary background canvas, with Search and Inspiration acting as functional overlays.

#### A. The Canvas: Interactive Map Portal

- **Interaction:** The map occupies the full screen immediately upon load.
- **Visuals:** Renders "Apex Orange" route ribbons in the user's vicinity.
- **Map Gestures:**
  - **Line-Tap:** Tapping a route ribbon directly on the map triggers the **Route Summary Bottom Sheet**.
  - **Clustering:** If routes are geographically overlapping, a single tap triggers a "**Spider-Leg**" **expansion** or zoom-in; a second tap selects the specific line.

#### B. Top Overlay: Search & Creation

*Floating at the top of the Map Canvas.*

##### 1. Omni-Search Bar:

- **Search Logic:** Queries the curated route library by name, region, or POI.
- **Real-time Suggestions:** Displays a maximum of 3 "Recent" searches and 5 "Predicted Locations/Routes" as the user types.
- **The "Empty State" Pivot:** If no search results match, the system displays a high-prominence CTA: "*No routes found. Create your own route.*"

2. **Creation CTAs:** Two distinct buttons positioned immediately below the Search Bar:

- "**Manual Plan**": Launches the Draftsman tool.
- "**Auto Create**": Launches the AI Architect.

## C. Bottom Overlay: Categorized Inspiration (Scrollable Stacks)

*Horizontal scrollable containers located at the bottom of the screen, overlaying the map.*

1. "**Nearby Me**":

- **Logic:** Initially queries routes within a **25km radius**.
- **Expansion Logic:** If result count < 3, automatically expand radius in increments up to **300km**.
- **Fallthrough:** If no routes exist within 300km, replace the stack with a wide-format CTA card: "*Nothing nearby. Be a pioneer and create a route.*"

2. "**Themes**":

- **Relaxed:** (High SSS, Scenic).
- **Deep Flow:** (Technical, High Curviness Index).

3. "**Time-Based**":

- The Quick Escape: (30m).
- The Sprint: (1h).
- The Odyssey: (4h+).
- **UX Interaction:** Category Title Click opens a Vertical List View. Route Card Click opens the Route Summary Bottom Sheet.

## 2.2 List View: Sorting & Filtering Logic

*Applicable to Search Results and Expanded Categories.*

### 2.2.1 Sorting ("Soft" Boundary)

- **Default (Search):** "Relevance" (weighted by proximity to current GPS and keyword match).
- **Default (Category):** "Distance" (Absolute distance to the start point).

## 2.2.2 Filtering ("Hard" Boundary)

Filters strictly exclude routes that do not meet chosen criteria.

- **Quick-Access Pills:** Horizontal scroll of buttons (e.g., "SSS > 9", "Curvy", "< 1 Hour").
- **The "Flow Filter" Sheet:** A bottom-drawer UI for complex combinations.
  - **SSS Threshold:** Slider ranging from 1.0 to 10.0 (e.g., "Only show SSS 8+").
  - **Atmosphere:** Multi-select chips (Alpine, Coastal, Forest, Industrial).

## 2.3 The Route Evaluation Hierarchy (Overview & Details)

To maintain a low cognitive load, the system uses a progressive disclosure model. Selection of a route triggers the "**Handshake Animation**: the background map executes a "Fly-to" to center the route polyline while the evaluation UI slides up.

### 2.3.1 Layer 1: The Route Overview (The "Hook")

**UI Component:** Bottom Sheet (40% Screen Height).

- **Visual Header:** A high-resolution hero image (Logic: Waypoint → Destination → Generic Atmosphere).
- **Primary Identity:**
  - **Title:** Bold, high-contrast typography (e.g., "*The Black Forest Hairpins*").
  - **Author:** Verified Pilot name or "Peak Flow Curated."
- **The "Vitals" Bar:** Four key icons with real-time values:
  - **Distance:** Total length in \$km\$.
  - **Estimated Time:** Based on a spirited driving profile (not standard traffic).
  - **SSS Badge:** The 1–10 score in its color-coded ring (e.g., **9.4 - Apex**).
  - **Curviness Index (CI):** A 1–5 "Zig-Zag" rating representing technicality.
- **Social Engagement:** Total "Heart" (Like) count.

### 2.3.2 Layer 2: The Route Details (The "Deep Dive")

**UI Component:** Full-Screen Modal. Accessed by swiping up on the Overview Sheet.

- **Surface Composition:** Percentage breakdown (e.g., **98% Asphalt / 2% Paved**). *Note: Any "Unpaved" % triggers a red alert.*
- **Elevation & Gradient Profile:**
  - **2D Graph:** A linear plot showing altitude changes (\$m\$) over total distance.
  - **Max/Min Gradient:** Highlighting the steepest sections (e.g., **Max Grade: 11%**).
- **The "Chassis Threat" List:** An itemized list of specific SSS deductions:
  - *"3 Speed Humps detected"*
  - *"1 Pothole reported (24m ago)"*
- **Gallery & Waypoints:** Community photos and vertical timeline of planned stops (Scenic overlooks, High-octane fuel).

### 2.3.3 Standardized Action Bar (CTAs)

Sticky at the bottom of both Overview and Detail views.

- **Start Drive (Primary):** Launches TomTom SDK Nav + triggers "Send to McLaren" prompt.
- **Form Convoy (Secondary):** Transitions to Squad Tab; pre-populates the builder with this route.
- **Share (Icon):** Opens iOS Share Sheet with a Peak Flow Universal Link.
- **Heart (Icon):** Toggles "Favorite" status.

## 2.4 Automatic Route Generation (The "AI Architect")

*Triggered via the Top Overlay CTA or Search Empty State.*

### Mode A: Voice-to-Flow

- **Input:** User records voice intent (e.g., *"Find me a curvy 2-hour loop heading North with no speed humps"*).
- **Orchestration:** **Claude/Gemini** processes intent \$\rightarrow\$ JSON Object (Start, Waypoints, Destination).

- **Validation:** TomTom SDK snaps to road \$\rightarrow\$ Automatic **SSS Audit** (checks for hazards).

### Mode B: Parameter Selection

- **Duration:** Slider from **<1h** up to **Multiple Days**.
- **Direction:** Selectors for **North, South, East, West**.
- **Characteristics:** Toggle **Challenging** (Technical/Curve-focused) vs. **Relaxing** (Scenic/SSS-focused).

## 2.5 Manual Route Planning (The "Draftsman")

*Triggered via the Top Overlay CTA.*

- **Waypoint Management:** Search-to-Add major stops or **Long-Press-on-Map** to drop pins.
- **Rubber-Banding:** Interactively drag route polyline to "snap" to specific roads.
- **System Logic:** Native Snap-to-Road ensures driveability; Hard toggle to "Minimize Speed Humps".

## 3. Epic 2: Squad (Convoy & Social Coordination)

*The Squad tab is the mission control for group driving. It transitions from a Planning Hub to a Tactical Execution Engine.*

### 3.1 Squad Start Page Structure

- **Primary Action:** **Create Convoy** (Instant/Scheduled) and **Join Convoy** (Enter 6-Digit Code / Scan QR).
- **Secondary Action:** "Radar" (nearby public convoys) is relegated to a small icon/secondary tab.
- **Builder Flow:** Add Users (Search) \$\rightarrow\$ Add Title \$\rightarrow\$ Add Route \$\rightarrow\$ "Drive Now" or "Schedule Event".

### 3.2 Convoy Mode Execution

- **Digital Tether:** Leader dictates route; Followers use `reconstructionMode: .track` via TomTom SDK for 100% parity.

- **Spatial Audio:** PTT voices panned via Azimuth calculation:  $\theta = \operatorname{atan2}(\Delta \text{Lon}, \Delta \text{Lat}) - \text{Heading}$ .
  - **Fragmentation State Machine:**
    - **Connected (\$<1km\$):** "Pack Green."
    - **Fragmented (\$1km - 2.5km\$):** "Orange Alert: Gap detected."
    - **Disconnected (\$>2.5km\$):** "Critical: Follower Lost."
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## 4. Epic 3: Library (Trips & Performance)

*Consolidated Tab 3 containing History, Performance, Favorites, and Wishlist.*

### 4.1 Trip History (The Memory)

- **Auto-Record:** Logs all trips  $>2\text{km}$ .
- **Recap View:** Displays photos, notes, and route summary (The "Scrapbook").

### 4.2 Performance Layer (Sub-Feature)

*Located as a secondary toggle within a specific Trip entry.*

- **Telemetry:** GPS trajectory, gear selection, fuel consumption, speed peaks.
- **Heatmaps:** Map overlays showing Speed Intensity and G-Force rankings.
- **Benchmarking:** Segment-based rankings (e.g., "Sector 3 Time").

### 4.3 Social Logic

- **Favorites:** Hearted routes synced for offline planning.
  - **Wishlist:** Routes saved for future consideration.
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## 5. Technical Specifications

### 5.1 Supercar Suitability Score (SSS)

- **Formula:**  $SSS = 10 - (D_{unpaved} + D_{hump} + D_{pothole})$ .
- **HMI Alerts:** Visual icon displayed **200m** prior to deflection; flash interrupt for real-time pothole reports.

## 5.2 Offline Capability

- **20GB FIFO Cache:** Prioritizes map tiles, SSS gradient data, and convoy telemetry for areas without cellular signal.

## 5.3 Forced Geometry Logic

- **Mechanism:** App pushes a dense array of coordinates (every 100m) to the TomTom SDK.
- **Real-time Editing:** If the Leader modifies the route, the new polyline is pushed via MQTT, forcing an instant sync.