AutoStream

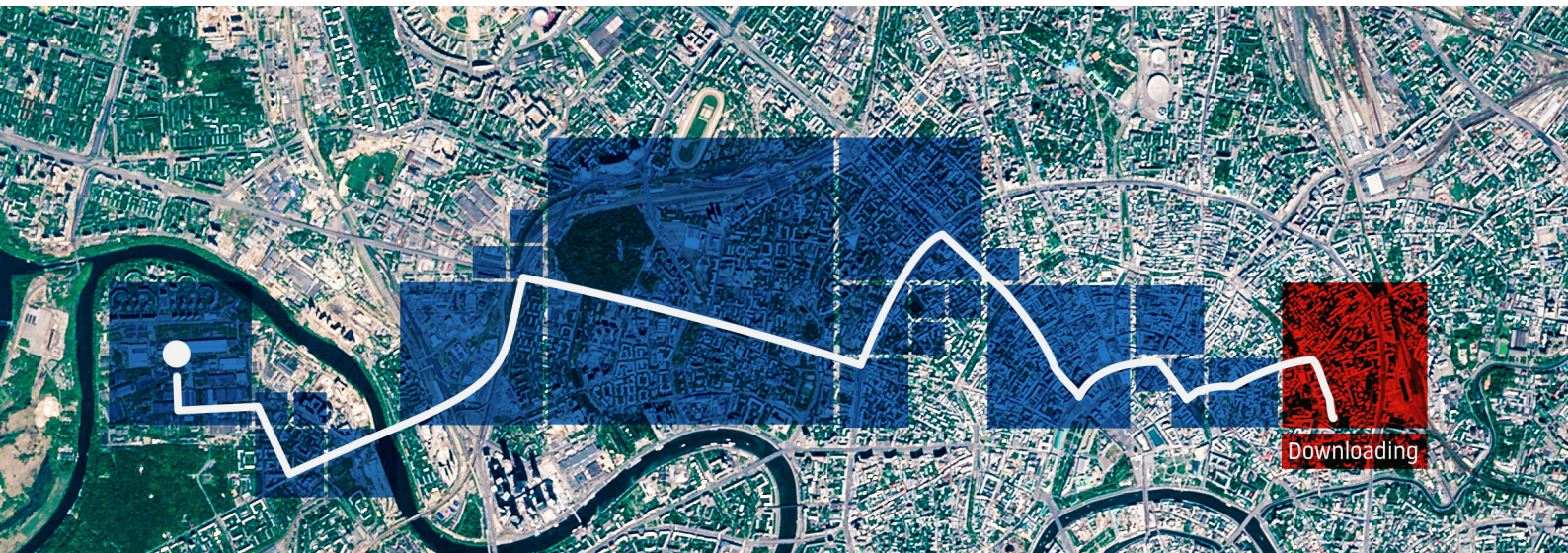
Innovative map delivery for automated driving

Overview

For Advanced Driver Assistance Systems (ADAS) and autonomous driving to be safe and comfortable, digital map data should be used to anticipate the road geometry ahead. Fast and low-cost delivery of the most up-to-date map data to the vehicle is also critical. The type of map data needed will differ based on the use case. For example, Highway Pilot functions need detailed map content for highways only while ADAS features for hybrid vehicles will require less accurate, but more expansive map coverage.

TomTom AutoStream answers these diverse needs in one product with on-demand streaming of High Definition (HD) and/or ADAS Map data. All map data is streamed, using a light-weight map format optimized for streaming purposes, from the TomTom cloud to the in-vehicle application. To make the data stream well-coordinated and efficient, AutoStream also comes with an on-board client software component with smart logic. Lastly, AutoStream can be extended with an ADASIS v3 compliant horizon provider to significantly simplify and shorten the development time. A horizon provider allows an automated vehicle to “see” the road ahead without being limited by sensor range and plan its path accordingly, leading to a safer and smoother driving experience.

Features	Benefits
Map access API	Allows the vehicle application to efficiently access the necessary data in an easy-to-use format and enables customization of the map data stream
Hints interface	Enables proactive downloading and caching of map data, based on route or map data, to become more robust against cellular network outages
Local cache	Stores all downloaded map data to reduce data consumption and onboard storage needed



End user benefits

- For drivers, AutoStream increases safety as the driving automation function always has access to the most recent map data with a proactive downloading strategy to anticipate the road ahead
- For system integrators, the AutoStream client software reduces complexity for the application by converting map tiles into a semantic map and delivers easy customization of the map data stream
- For car manufacturers, reduced operational costs via lower onboard storage needs and cellular data consumption due to the efficient AutoStream map format

Sample applications

Intelligent Speed Assist: Use the speed restriction content from the TomTom ADAS Map for overspeed warnings, speed control functions and improved NCAP ratings

Predictive Cruise Control: Increase driver comfort and powertrain efficiency with pro-active gear shifting and with the most recent map data delivered per AutoStream

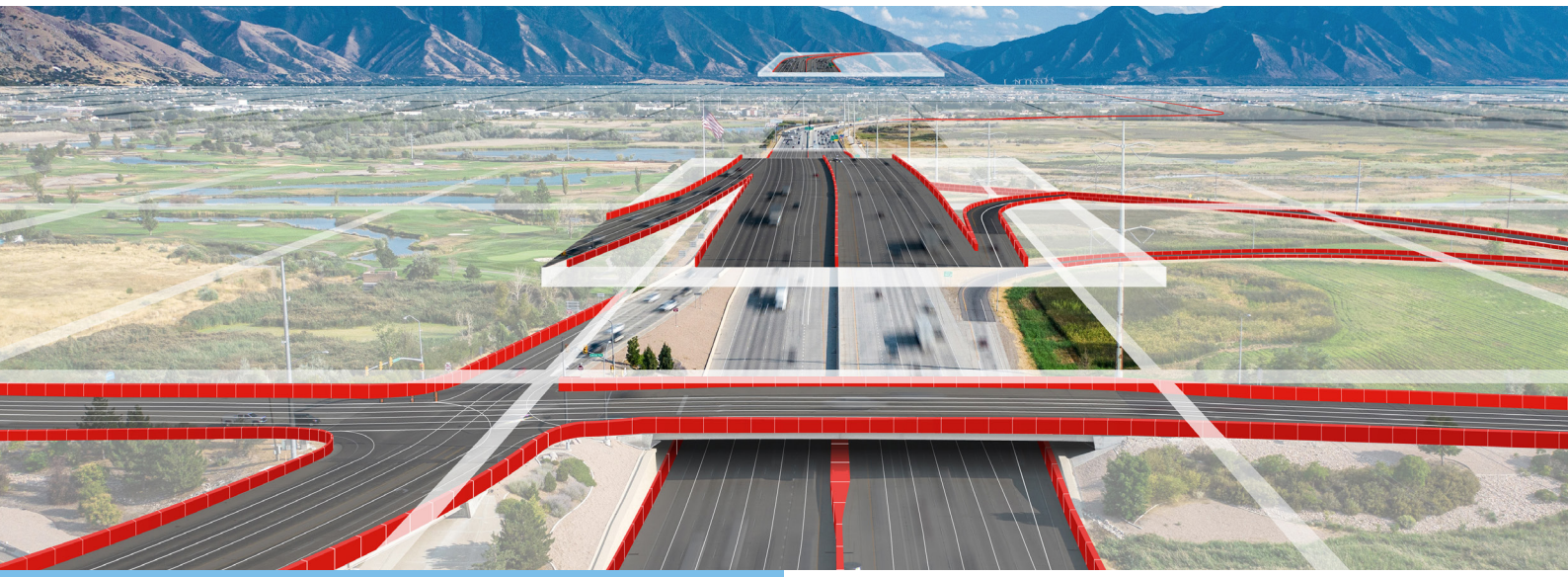
Highway Pilot: Improve safe activation and performance with lane-level geometries, and localization objects from the TomTom HD Map

How AutoStream works

TomTom AutoStream streams map data from the TomTom cloud to the in-vehicle application and consists of two components:

1. **The AutoStream service:** An online back-end component which compiles map data into size-optimized tiles and makes those available for download via a content distribution network
2. **The AutoStream client**: An onboard software component which handles the download of the map tiles from the AutoStream service and exposes the map data via the Map access API

The intended usage of AutoStream is as follows. The driving automation function requests map data from the AutoStream client for specific routes and/or regions, using either the direct Map Access or the Hints API. To optimize data usage, latency and resilience to reduced cellular network coverage, the Hints interface can be used to trigger pre-caching of potentially upcoming map requests. Next, the AutoStream client accesses the AutoStream service (potentially via OEM cloud) to receive the related map tiles. With that map data, a horizon provider application can build a full vehicle horizon, which can be augmented with data coming from other in-vehicle sensors. Running in the background, the AutoStream service compiler continuously checks and updates the map tiles to keep the map data the most up-to-date possible.



TOMTOM.COM