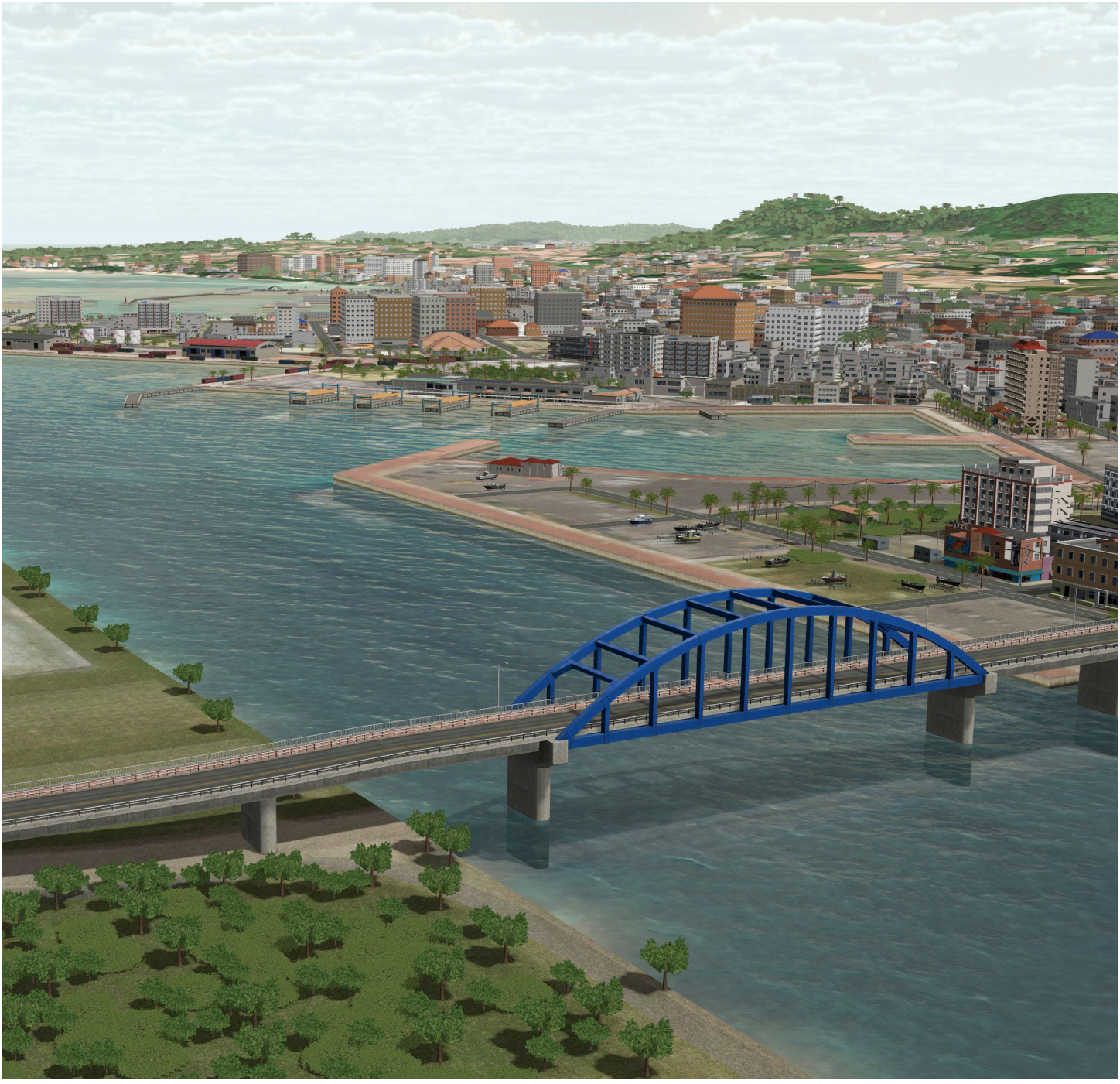
MVRsimulation

3D Terrain

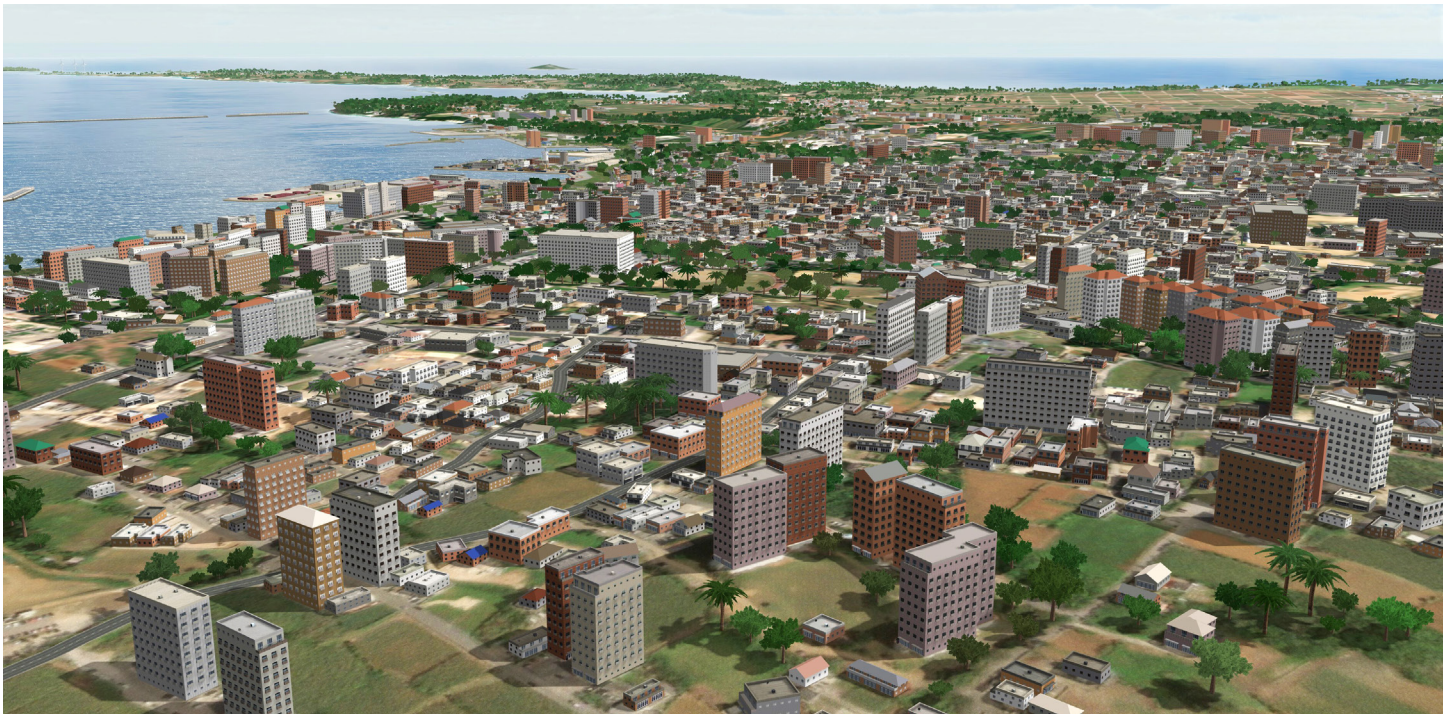


MVRsimulation® provides world-class 3D terrain databases for real-time visualization in training and simulation environments. MVRsimulation has built geospecific 3D terrain covering the continental USA, including Alaska and Hawaii, as well as the continents of Africa, Asia, Australia and Oceania, Europe, North America, and South America, all in its round-earth VRSG terrain architecture. These 3D terrain databases were created using MVRsimulation's Terrain Tools for ArcGIS® Pro for real-time visualization in Virtual Reality Scene Generator® (VRSG®).

The terrain databases are usable for rendering virtual worlds in applications such as intelligence, surveillance, and reconnaissance (ISR), joint fires close air support (CAS) exercises, fixed- and rotary-wing cockpit simulation, and UAV/RPAS simulation. MVRsimulation updates these terrain databases on an ongoing basis as new, higher-resolution source data becomes available.

Image on the cover: *Geospecific, artist-rendered 3D model of Southern Gate Bridge at the port of Ishigaki, Japan located in the East China Sea.*

Asia

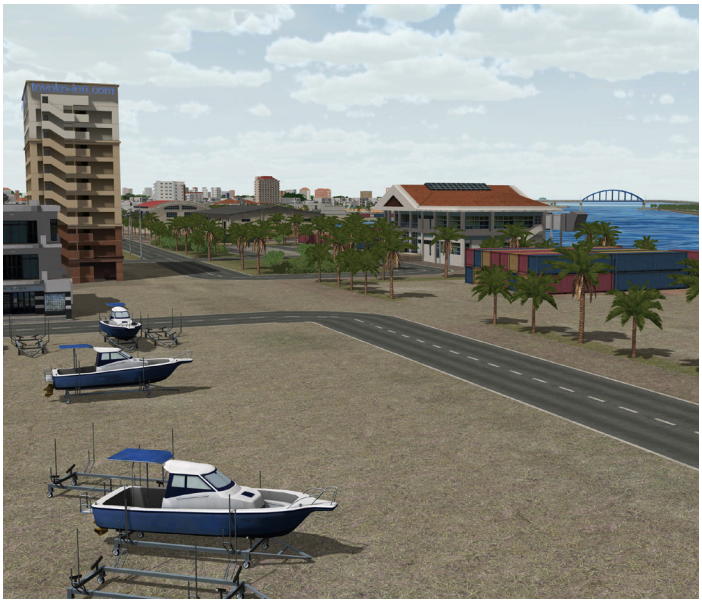


VRSG real-time image of the city of Miyako, Japan. The Miyako terrain database is rendered with geospecific bridge, port and building models. The surrounding area includes 3D building models with geotypical textures located using an ArcGIS® CityEngine® rule package.

The virtual terrain of Asia was created using imagery source data from various resolutions ranging from 50 cm to 15 meters-per-pixel (mpp). Several insets feature high-resolution city areas at 50 cm, which are blended with 2.5 mpp to 15 mpp imagery. The Asia drive includes modeled cultural areas of the following cities: Kabul, Afghanistan; Baghdad, Iraq; Okinawa, Japan, including the islands of Miyako and Ishigaki; Tokyo, Japan; Mount Fuji, Japan; Mischief Reef, South China Sea; Seoul, South Korea; Hajin, Syria; Dubai, United Arab Emirates; and Aden, Yemen.

Ishigaki and Miyako Islands
In 2024, MVRsimulation added high-resolution insets of detailed 3D terrain for Ishigaki and Miyako islands, located in Japan's Okinawa Prefecture in the East China Sea. The terrain was developed in response to customer requests and ongoing global concerns, using 50 cm imagery and 30-meter elevation data.

Taiwan
New in 2024, the Asia drive now offers full coverage of the island of Taiwan at a resolution of 50 cm, including portions of the Penghu Islands and Green Island. The terrain is populated with thousands of tree models from MVRsimulation's culture 3D model libraries, which were color-sampled from the underlying 50 cm terrain imagery.



VRSG real-time scene of Ishigaki Port, a vital hub connecting Japan with Southeast Asia including over 70 unique, geospecific building models, hundreds of detailed models of boats, containers, vegetation, and poles.

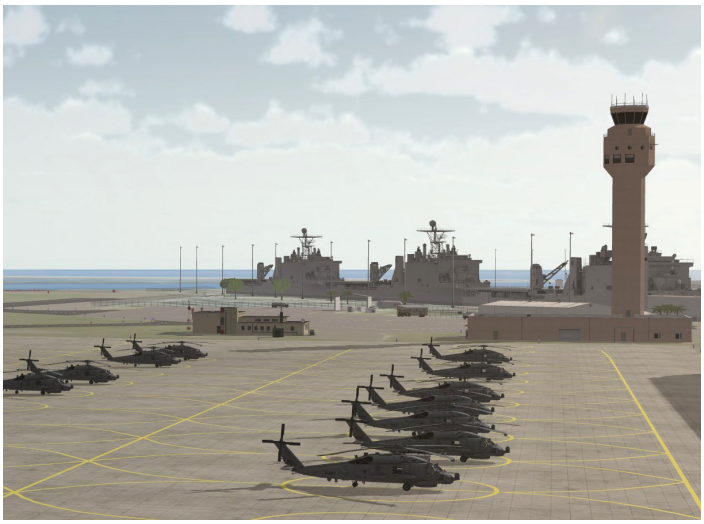
CONUS NAIP plus Alaska and Hawaii

The CONUS terrain was recently rebuilt using 1-meter National Agriculture Imagery Program (NAIP) imagery, with the exception of Alaska and Hawaii. The updated NAIP terrain for CONUS was combined with 10-meter per-post National Elevation Database (NED) elevation data. The terrain also includes several high-resolution insets, ranging from 5 mm per pixel to 60 cm imagery.

The CONUS NAIP terrain is available by region: North Central, Northeast, Northwest, South Central, Southeast, and Southwest. There are several modeled databases, including airports, military operations on urban terrain (MOUT) sites, cities, and towns. For the complete list, visit www.mvrsimulation.com.

Mayport Naval Station

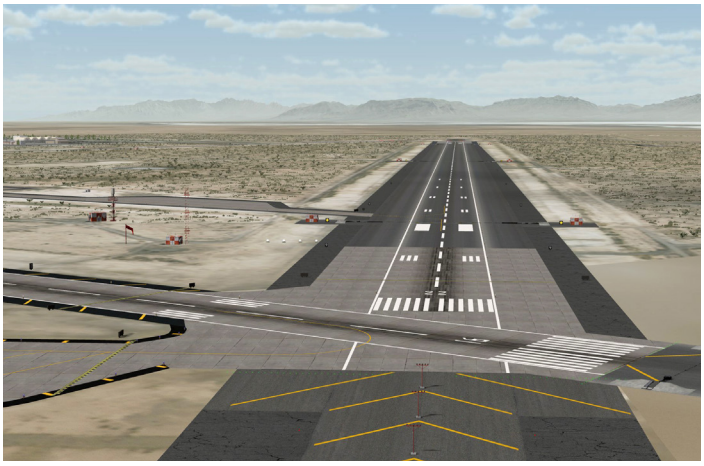
Now available in 2024, MVRsimulation's modeled Mayport Naval Station features runway lighting and navigational signs. Building models have been placed along the flightline, and CityEngine models were constructed around the Naval Station. The area is also populated with several tree models. Additionally, the database includes a 3D representation of the ocean shoreline, along with bathymetric data of the port.



Virtual Mayport Naval Station which is part of VRSG's CONUS NAIP Southeast database. Surrounding buildings were extruded using CityEngine from OpenStreetMap building footprints.

Holloman Air Force Base

Introduced in 2024, MVRsimulation's modeled Holloman Air Force Base features runway lighting, navigational signs, taxiways, windsocks, and tarmacs along with geotypical hangars and control tower. Several 3D tree and vegetation models have been integrated into the terrain. This terrain is part of the Southwest CONUS NAIP terrain database.



VRSG's Holloman Air Force Base database is built from high-res 30 cm imagery seamlessly blended into 1-meter resolution NAIP imagery for the surrounding areas.

Several high-resolution 3D culture areas are included throughout the CONUS NAIP terrain including military training sites, airports, and urban centers. Many of these areas are modeled from photographs taken at the actual sites. The CONUS NAIP terrain also contains three AOIs that were built with sub-inch resolution imagery collected by MVRsimulation's small UAS: the Prospect Square area of the Yuma Proving Ground, AZ; two target ranges at the Fallon Range Training Complex, Naval Aviation Warfighting Development Center (NAWDC) at Naval Air Station (NAS) Fallon, NV; and Amarillo International Airport, TX.

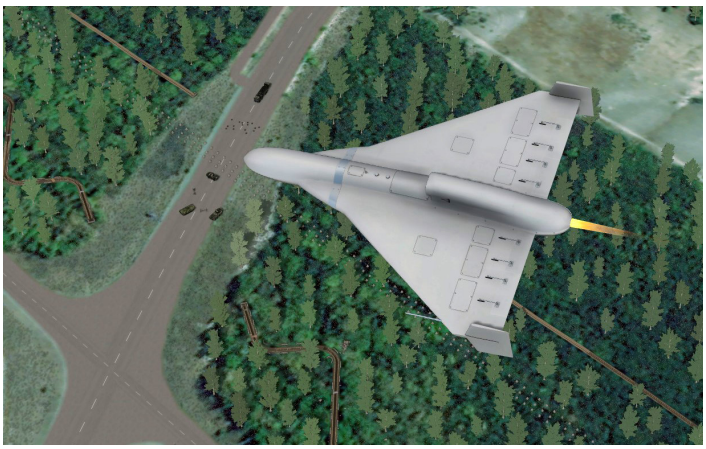
CONUS NAIP airports were built at the request of customers. In most cases, a site-specific control tower was built (based on publicly available photos) and used with a combination of geotypical airfield models from MVRsimulation's extensive culture model libraries. Cultural features for some airports are geospecific based on publicly available images.

Europe

MVRsimulation's Europe terrain was built from imagery source data ranging from 30 cm to 15 mpp. Highlights of this terrain include countrywide coverage of Spain and Portugal at 50 cm. There are also several high-resolution areas at 50 cm in Ukraine. The Europe database also includes the cultural databases of several cities in Latvia, the Monte Real Airport in Portugal, a CityEngine replica of Kaliningrad (Russia), and several cities in Spain, including the Albacete Airport.

Luhansk, Ukraine

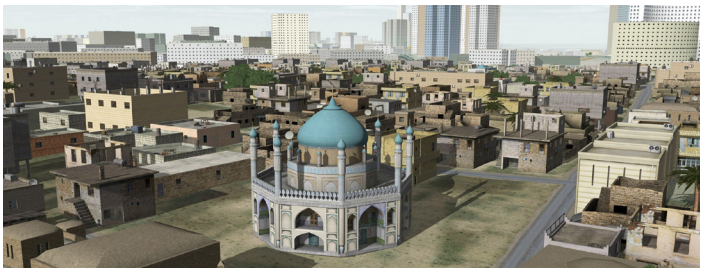
The Luhansk terrain database includes a modeled inset of the city of Luhansk in eastern Ukraine. This database was built from 30 cm imagery and features CityEngine buildings, trenches, road networks, streetlights with light lobes, power lines, and thousands of tree and grass models. The trench models are designed to meet diverse simulation needs, providing realistic representations for tactical training and operational planning in virtual environments.



A real-time scene of MVRsimulation's 3D model of a Shahed 238 loitering munitions drone above the Luhansk, Ukraine terrain with cultural vegetation and cut in trenches.

Africa

The Africa terrain database includes several 60 cm natural color insets of major cities, including a detailed replica of the port city of Kismayo, Somalia. The Kismayo database is enhanced with hundreds of geospecific cultural models created from ground-level photographs taken right from the streets of Kismayo. Additionally, the virtual representation of Tripoli, Libya's capital, showcases several building models using CityEngine, alongside geotypical Middle Eastern structures from MVRsimulation's extensive culture model libraries.

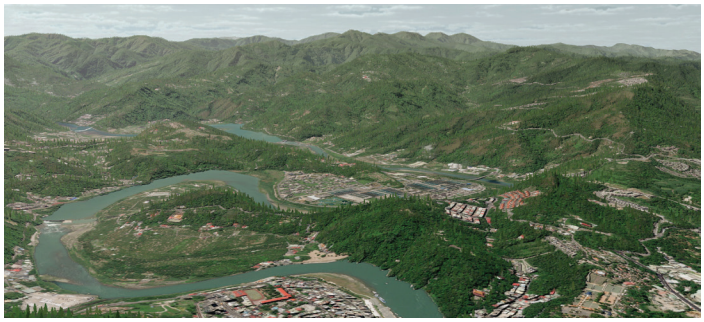


Virtual replica of Tripoli, Libya with a geospecific building surrounded by geotypical CityEngine buildings.

Delivery

As additional source data becomes available, MVRsimulation will continue to build higher-resolution terrain tiles of its 3D terrain databases. MVRsimulation's 3D terrain databases are available to customers who are on active VRSG software maintenance. Certain databases are limited to U.S. Government or NATO agencies or contractors (for official use only). New terrain databases are provided in MVRsimulation's round-earth VRSG terrain architecture and will only run with a valid VRSG7 software license with active software maintenance.

MVRsimulation's 3D terrain is distributed on portable, external drives by region. A full set of terrain is distributed on a direct attached large volume (DALV) device or a Network Attached Storage Device (NAS).



Full coverage of Taiwan is now available on the MVRsimulation's Asia terrain drive. The Taiwan terrain database includes imagery at a resolution of 50 cm with color-sampled 3D tree models.

Australia and Oceania

The Australia terrain includes several 60 cm high-resolution natural color insets of several areas of interest including Sydney, Perth, Canberra, Melbourne, and Brisbane.

The Oceania terrain also includes several 60 cm high-resolution natural color insets of Pohnpei and Weno Islands, Federated States of Micronesia; Auckland and Christchurch, New Zealand; Rota Island and Tinian & Saipan Islands of the Northern Mariana Islands. The terrain also includes a 30 cm inset of Guam.

North America (Excluding CONUS)

The North America terrain data set is comprised of Canada, Greenland, Mexico, the Caribbean, and Central America, and includes 60 cm high-resolution natural color insets of many capital cities and other cities of interest.

South America

The South America terrain database includes 60 cm high-resolution natural color insets of many South American capital cities and other cities of interest.

Rapid 3D terrain creation and modeling

Terrain Tools for ArcGIS Pro allows users to compile recent satellite or aerial imagery into round-earth VRSG terrain architecture. This imagery can be seamlessly blended into the surrounding areas of terrain to provide an up-to-the-moment visual terrain representation to give war fighters the tactical advantage for mission planning and rehearsal.

Using Terrain Tools & CityEngine you can rapidly build up geotypical 3D content from building footprints. The ability to integrate GIS data and adjust parameters interactively makes this an efficient tool for creating large, realistic 3D models for simulations. Visit downloads.mvrsimulation.com to download the CGA rule files composed by MVRsimulation to incorporate into your 3D terrain tiles.

The Tampa Bay, Florida VRSG terrain database was created using CyberCity 3D's high-resolution model textured using CityEngine for realistic urban and natural features.

For more information, visit www.mvrsimulation.com, contact sales@mvrsimulation.com, or scan the QR code.

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