

# How can vast geospatial image mosaics be compressed and distributed?

GeoCompressor is the solution





**GeoCompressor allowed GeoSpace to create a single mosaic from 49,000 separate image tiles, resulting in huge disk space savings and, most of all, an unparalleled performance and speed in displaying and using the resultant image.”**

GeoSpace International

## Meeting the challenge

At Hexagon, we strive to provide multiple industries the technology necessary to collect, analyse, and share data, making our world safer and lives easier. Our eyes are open to seeing and addressing new challenges. As a result, we noticed a cross-industry struggle to compress large, high resolution imagery and point clouds, creating a need for technology that:

- Can compress terapixel-sized imagery and point cloud files with billions of points
- Can compress thousands of image files into a single mosaic or update a region within an existing mosaic
- Can resize or resample pixels to shrink images where full resolution data is not required
- Can clip to a polygon boundary to create custom output products
- Can be plugged into existing data processing workflows as a decoupled component to do the final mosaic and compression step prior to delivery
- Supports Microsoft Windows and Linux operating systems
- Is cost effective

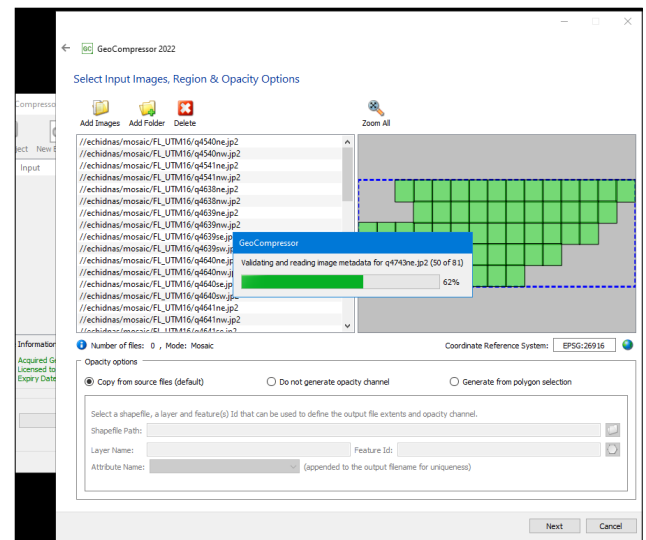
GeoCompressor was created to address those needs and more, offering compression technology that quickly optimises your organisation's usage, storage and performance working with large imagery datasets.

## What is GeoCompressor?

GeoCompressor is a high-performance geospatial image and point cloud compression application that allows you to access our unparalleled compression technology. Throughput in excess of 250 MB/sec can be seen on commodity hardware while processing terapixel-sized images, making GeoCompressor the most high-performance mosaicking and compression tool on the market and in some cases, the only solution that is able to work with these data sizes.

GeoCompressor is a targeted application designed to address data provider pain points optimising processing workflows. This targeted niche allows us to optimise to a degree simply not possible with other more general geospatial software products.

Our heavily optimised 64-bit, hardware accelerated application also offers cross-platform support across Windows and Linux operating systems. GeoCompressor has an accelerated core processing engine, yet it is still designed for both power and standard users alike. A simple wizard interface helps to define the process or power users can use it to have finer-grain control.



GeoCompressor mosaic wizard.

## What can you do with image compression?

GeoCompressor offers multiple options when compressing data. The application supports all common industry input file types and will then optimise and compress output to the Enhanced Compression Wavelet (ECW) or JPEG2000 (JP2) formats. Within the system, you can:

- Compress a single file
- Compress a batch of images into a mosaic
- Update a region within an existing ECW v3 file, eliminating the need to recreate a mosaic to include new data
- Create multiple compressed output files clipped to polygon boundaries from a single mosaic

## GeoCompressor's file output options offer varying capabilities:

Capability	ECW v2	ECW v3	JPEG2000
Line compression (single-thread)	✓	✓	✓
Tile compression (multiple-threads)	✓	✓	
8-bit unsigned	✓	✓	✓
16-bit unsigned		✓	✓
16-bit signed			✓
Visually lossless	✓	✓	✓
Numerically lossless			✓
Null block support		✓	
Opacity band support	✓	✓	✓
Data statistics, histogram (embedded)		✓	
RPC storage		✓	
Custom metadata		✓	✓
Region update		✓	
Georeferencing	GDT	GeoTIFF tags	GML in JP2, GeoJP2
Color-space support	Greyscale, RGB, multiband	Greyscale, RGB, multiband	Greyscale, RGB, multiband
Largest-known image	32 terapixels	48 terapixels	756 gigapixels



## More about ECW

ECW is a Hexagon proprietary high-performance image format designed for large geospatial imagery. Due to its longevity in the industry, it has extensive support across products across the geospatial industry while providing the fastest compression and decompression rates.

When selected as the output, this format achieves 94% compression at a 15:1 ratio from the original file size, allowing you to reduce storage requirements across your infrastructure and enable one format to be used across all application types. These smaller files become easier to store, send and display, even on mobile devices.

Unlike other formats, ECW files are already optimised for display performance, so there's no need to generate, store or maintain image tiles, overviews or tile caches. Compress and go.

## ECW in action

### Raw imagery

3,659,118 x 2,836,274 px

4 Band, RGB

45,816 image files

28,996.53 GB uncompressed

### Compressed to ECW

3 Band, RGB

Single image file

439.67 GB ECW compressed

Output is visually indistinguishable from original



Zoomed-in photo of the compressed image (near Uptington, Northern Cape province, South Africa). Images courtesy of GeoSpace International and the Chief Directorate: National Geo-spatial Information.

## Point cloud compression

Point cloud compression accepts LAS/LAZ/E57 file input, which are standard formats for airborne LiDAR data. The content is compressed to Hexagon Special Point Cloud (HSPC) files, a new format designed by Hexagon. HSPC utilises a tile-based output making it trivial to deploy on a web server for direct access, or for viewing in Hexagon clients such as LuciadRIA. HSPC adoption will continue to increase as more Hexagon software releases are announced.

These files can be viewed and utilised across other Hexagon geospatial applications and compressed up to 10 times smaller than the original data.



A single ECW aerial image covering South Africa @50cm GSD.







## Different options for your needs

To further offer versatility, GeoCompressor is available across three packaging tiers:

Capability	Essentials	Advantage	Professional
Image compression <250 gigapixels per job	✓	✓	✓
Image compression <500 gigapixels per job		✓	✓
Image compression unlimited per job			✓
Image mosaicking (up to gigapixel limit)	✓	✓	✓
Batch image compression (up to gigapixel limit)	✓	✓	✓
Point compression unlimited			✓
ECW v3 region update			✓
Concurrent license	✓	✓	✓
Subscription-only	✓	✓	✓
CPU thread limit per job	4	8	Unlimited

## Need a larger functional scope?

GeoCompressor is designed to complement existing data provider processing workflows for geospatial imagery and point cloud data. GeoCompressor is laser focused at rapid, high throughput mosaicking and image compression only; ensuring no matter the size of the output, it will reach your customers faster than any other solution.

Should you require a full data processing pipeline, other Hexagon software solutions are ideal, such as:

- ERDAS IMAGINE
- GeoMedia
- ImageStation

Hexagon's industry expertise across large image compression domain means ECW and JPEG2000 are supported across a wide variety of other Hexagon and third-party software.



Hexagon is a global leader in digital reality solutions, combining sensor, software and autonomous technologies. We are putting data to work to boost efficiency, productivity, quality and safety across industrial, manufacturing, infrastructure, public sector, and mobility applications. Our technologies are shaping production and people-related ecosystems to become increasingly connected and autonomous – ensuring a scalable, sustainable future.

Hexagon's Safety, Infrastructure & Geospatial division improves the resilience and sustainability of the world's critical services and infrastructure. Our solutions turn complex data about people, places and assets into meaningful information and capabilities for better, faster decision-making in public safety, utilities, defense, transportation and government.

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