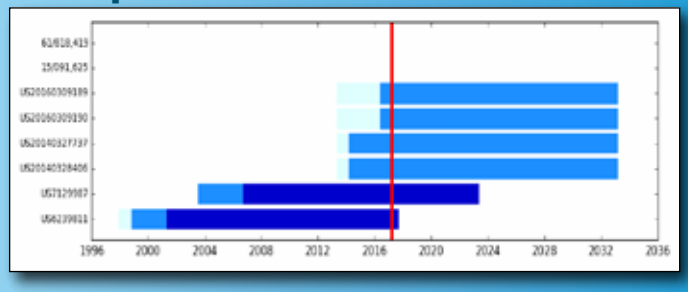
# ZPEG Video Compression

## Patent Portfolio Offering

## Quick Facts

- **Patent assets:** 1 Issued US Patent, six Applications
- **Earliest priority date:** 2003
- **Technology:** Video Compression
- **Encumbrances:** None
- **Lifespan (average):** 12 Years

## Lifespan:




## Portfolio Overview

ZPEG is an innovator in the video compression space. The ZPEG product portfolio is a patent-protected collection of ready-to-monetize and forward-looking technologies in the video compression field. ZPEG offers a pre-processing solution, advanced VR and ABR compression technologies, and broadcast industry technologies.

In short, ZPEG's patented technologies reach the theoretical limits of video compression using innovations unmatched in the industry. Video files can be compressed to a size smaller than previously achievable and yet decompressed without infrastructure change. ZPEG technology therefore provides a decrease in the amount of storage needed and bandwidth required to transmit video, resulting in savings of many millions of dollars for heavy volume video content distributors.

The ZPEG Pre-processor is an application of the Human Visual Model to decorrelated spatio-temporal transform space – the basic concept underlying ZPEG's patent portfolio. The decorrelated transform domain supports theoretically ideal removal of imperceptible visual data. ZPEG's Human Visual Model goes a step further by calibrating the model to a specified viewing distance, enabling the removal of *all* imperceptible data from the video stream at a desired visual quality. The ZPEG pre-processor is able to perform the removal in advance, following a well-defined theoretical model that guarantees optimality for a specified quality. This guarantee of optimal compression cannot be offered by any competing technology.

The ZPEG Video Codec employs the same advanced Human Visual Model as the Pre-processor, extracting all visual redundancies. The ZPEG Entropy Removal technique predicts the entropy

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# ZPEG Video Compression

## Patent Portfolio Offering

## Portfolio Overview (cont.)

context from the statistics of the video source, reducing the encoded video size, and as a result a single encoded video stream provides the optimal viewing experience at any desired bandwidth or VR viewing angle. As a pure transform-domain codec, the ZPEG Video Codec provides no – zero - buffering delay.

With respect to broadcast technologies, format conversion entails interpolating video content to predict missing data. As ZPEG's representation of video in the transform domain is statistically ideal, ZPEG's prediction of missing data is statistically optimall, making the ZPEG format conversion techniques the highest quality possible. ZPEG's technology also enables a full-reference subjective quality monitor.

The ZPEG patent portfolio includes one issued U.S. patent and six pending U.S. applications addressing and covering ZPEG technologies. Priority for the issued patent is 2003.

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# ZPEG Video Compression

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## Claim Word Cloud

## Covered Product

## Exemplar Claim Figure

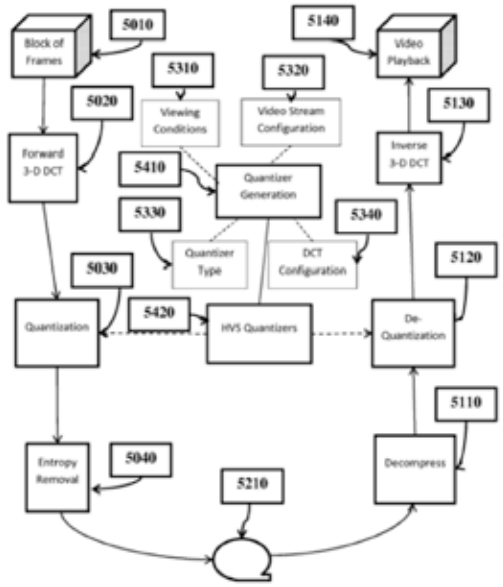


FIG. 5

## Exemplar Claim

Claim 51 of pending U.S. Patent Application Serial No. 15/189187 (Patent Publication 20160309189):

a) A quantizer generation system comprising:
b) a decorrelating transform unit configured to receive time-varying visual data and to generate decorrelating transform components in response;
c) a spatiotemporal contrast sensitivity unit to receive the decorrelating transform components and a specified transformation block size, the spatiotemporal contrast sensitivity unit to apply a spatiotemporal contrast sensitivity function to frequencies associated with the decorrelating transform components using the specified transformation block size; and
d) quantizer generation unit to receive a result of the spatiotemporal contrast sensitivity function and to determine values of visual quantizers associated with the time-varying visual data based at least in part on the result of the spatiotemporal contrast sensitivity function.

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# ZPEG Video Compression

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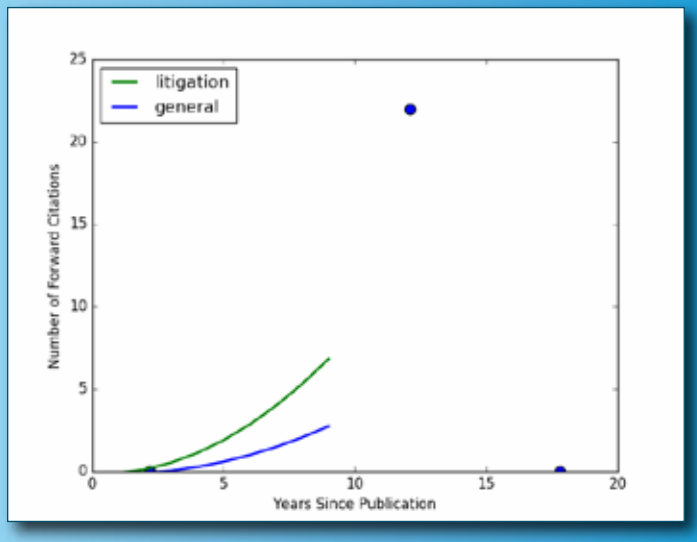
## Forward Citations Data

| Number | Cites | Years Since Pub |
|---|---|---|
| US7129987 | 22 | 12.1 |
| US20140328406 | 0 | 2.2 |
| US6239811 | 0 | 17.8 |
| US20160309190 | 0 | 2.2 |
| US20160309189 | 0 | 2.2 |
| US20140327737 | 0 | 2.2 |

## Forward Citations Parties

| Party | Cites |
|---|---|
| Via Technologies, Inc. | 6 |
| Marvell International Ltd. | 3 |
| Samsung Electronics Co., Ltd. | 3 |
| Qualcomm Technologies, Inc. | 2 |
| Akihiro Ohta | 1 |
| Entropic Communications, Inc. | 1 |
| Fujitsu Ten Limited | 1 |
| Hitachi Displays, Ltd. | 1 |
| Kabushiki Kaisha Toshiba | 1 |
| Masahiro Ogino | 1 |
| Sony Corporation | 1 |
| Volker Blume | 1 |

## Forward Citations




## Ranking Data

| Number | Online | Key Phrase | Claim | Word Count | RoI Score | Life Left |
|---|---|---|---|---|---|---|
| US6239811 | 0 | video data | 1 | 26 | 13 | 0.7 |
| US7129987 | 0 | coordinate values | 1 | 37 | 76 | 6.3 |

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# ZPEG Video Compression

## Patent Portfolio Offering

## Asset List

| Appl Type | App Serial No. | Date Filed | Publication | Patent No. | Issue Date | Status | Title |
|---|---|---|---|---|---|---|---|
| Provisional | 61/818,419 | 05/02/2017 | | | | Expired | Method and Apparatus to Perform Optimal Visually-Weighed Quantization of Time-Varying Visual Sequences in Transform Space |
| Utility | 09/187,489 | 11/07/2002 | N/A | 6,239,811 | 05/30/2005 | Abandoned - Non-payment of Maintenance Fees | METHOD AND APPARATUS TO MEASURE RELATIVE VISIBILITY OF TIME-VARYING DATA IN TRANSFORM SPACE |
| Utility | 10/612,805 | 07/03/2007 | N/A | 7,129,987 | 11/1/2010 | Patented | METHOD FOR CONVERTING THE RESOLUTION AND FRAME RATE OF VIDEO DATA USING DISCRETE COSINE TRANSFORMS |
| Utility | 14/266,757 | 05/01/2018 | US20140328406 | | | Suspended | Method and Apparatus to Perform Optimal Visually-Weighed Quantization of Time-Varying Visual Sequences in Transform Space |
| Utility | 14/266,645 | 05/01/2018 | US20140327737 | | | Suspended | Method and Apparatus to Perform Correlation-Based Entropy Removal from Quantized Still Images or Quantized Time-Varying Video Sequences in Transform |
| CON | 15/189,242 | 06/23/2020 | US20160309190 | | | Active | METHOD AND APPARATUS TO PERFORM CORRELATION-BASED ENTROPY REMOVAL FROM QUANTIZED STILL IMAGES OR QUANTIZED TIME-VARYING VIDEO SEQUENCES IN TRANSFORM |
| CON | 15/189,187 | 06/23/2020 | US20160309189 | | | Active | METHOD AND APPARATUS TO PERFORM OPTIMAL VISUALLY-WEIGHED QUANTIZATION OF TIME-VARYING VISUAL SEQUENCES IN TRANSFORM SPACE |
| Utility | 15/091,625 | 04/07/2020 | Unpublished | | | Active | METHOD AND APPARATUS TO PROCESS VIDEO SEQUENCES IN TRANSFORM SPACE |
| Utility | 15/427,570 | 02/09/2021 | Unpublished | | | Active | METHOD AND SYSTEM FOR IMPROVED IMAGE COMPASSION |
| Utility | 15/432,296 | 02/15/2021 | Unpublished | | | Active | METHOD AND SYSTEM FOR MEASURING VISUAL QUALITY OF A VIDEO SEQUENCE |

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- Offers should be single payment cash purchase price offers.
- AQUA will review the bids with Seller, and identify the highest bid. Sellers will either accept the highest bid or choose to initiate a subsequent round of bidding.
- AQUA will communicate status – of either accepting a winning bid or proceeding to a subsequent round of bidding – by close of business, 5pm PST on July 21st, 2017.
- Subsequent Bidding – At the start of a subsequent bidding round (if any), we will communicate to all invited parties the new reserve price and subsequent bid date, as well as the number of bidders who participated in the previous round. Subsequent bid dates will be within 3-5 business days of prior bid dates. These subsequent bidding rounds will conclude when there is only one bidder remaining.
- Closure – Once the winning bidder has been accepted by Sellers, we will bring the winning bidder and Sellers together to negotiate the closure of the Patent Sales Agreement (PSA).
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