

**IN THE UNITED STATES PATENT AND TRADEMARK
OFFICE**

BEFORE THE PATENT TRIAL AND APPEAL BOARD

CISCO SYSTEMS, INC.
Petitioner,

v.

REALTIME ADAPTIVE STREAMING, LLC
Patent Owner.

Case: IPR2018-01384
U.S. Patent No. 8,934,535

**PETITION FOR *INTER PARTES* REVIEW OF CLAIMS 1-6,
8-12, 14-17, 19, 21, 22, AND 24 OF U.S. PATENT NO. 8,934,535**

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Patent Trial and Appeal Board
United States Patent and Trademark Office
PO Box 1450
Alexandria, Virginia 22313-1450
Submitted Electronically via PTAB E2E

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PETITIONER’S EXHIBIT LIST

Ex. No.	BRIEF DESCRIPTION
1001	U.S. Patent No. 8,934,535 to Fallon <i>et al.</i>
1002	Declaration of Joseph P. Havlicek, Ph.D.
1003	Curriculum Vitae of Joseph P. Havlicek, Ph.D
1004	United States Provisional Application No. 60/268,394 (filed Feb. 13, 2001)
1005	File History for U.S. Patent No. 8,934,535
1006	U.S. Patent No. 6,309,424 to Fallon
1007	U.S. Patent No. 6,557,001 to Dvir et al. (“Dvir”)
1008	Iskender Agi & Li Gong, <i>An Empirical Study of Secure MPEG Video Transmissions</i> , Proc. of the 1996 Symposium on Network and Distributed Systems Security, IEEE (1996).
1009	Ke Shen, <i>A Study of Real-Time and Rate Scalable Image and Video Compression</i> , Purdue Univ. Thesis (Dec. 1997).
1010	Ke Shen & E. Delp, <i>Parallel Approaches to Real-Time MPEG Video Compression</i> , ICPP, Vol. 2 (1996).
1011	Rahul Garg, <i>Methods for Matching Compressed Video to ATM Networks</i> (1998).
1012	Krasmit Kolarov, et al., <i>Low Complexity Real-time Video Encoding for Soft Set-Top Box Platforms</i> , Technical Program of the Cable 2K Conf. (May 2000)
1013	U.S. Patent No. 5,845,083 to Hamadani et al. (“Hamadani”)
1014	U.S. Patent No. 6,195,024 to Fallon
1015	Memorandum Opinion and Order, <i>Realtime Data, LLC v. Actian Corp.</i> , No. 6:15-cv-463 (E.D. Tex.) (dated Jul. 28, 2016)

Ex. No.	BRIEF DESCRIPTION
1016	Mark Nelson, <i>The Data Compression Book</i> (1992) (excerpts)
1017	John Watkinson, <i>The MPEG Handbook: MPEG-1 MPEG 2 MPEG-4</i> (Focal Press 2001) (excerpts)
1018	IBM Dictionary of Computing, 269 (“file”) (1994 McGraw-Hill)
1019	John Morris, MPEG-2: The Main Profile, Chapter 3.11 in <i>Circuits and Systems Tutorials</i> , IEEE Press (1995)
1020	U.S. Patent No. 7,257,158 to Figueredo et al. (“Figueredo”)
1021	U.S. Patent No. 5,675,789 to Ishii et al. (“Ishii”)
1022	U.S. Patent No. 5,990,955 to Koz (“Koz”)
1023	U.S. Patent No. 4,467,317
1024	U.S. Patent No. 4,652,856
1025	U.S. Patent No. 4,122,440
1026	U.S. Patent No. 6,341,196 to Ando et al. (“Ando”)

I. MANDATORY NOTICES

A. Real Party-In-Interest

The real party-in-interest in this proceeding is Cisco Systems, Inc. (“Cisco”). Cisco is the sole party that has funded this Petition and has full and exclusive control over these proceedings.

B. Related Matters

While the original provisional patent application says nothing about video compression, *see generally* Ex. 1004, Patent Owner has alleged that it covers standardized video encoding technologies embodied in, for example, the H.264 video standard. Patent Owner has asserted the ’535 patent in at least the following civil actions:

- *Realtime Adaptive Streaming LLC v. Samsung Electronics Co., Ltd, et al.*, No. 6:18-cv-00113 (E.D. Tex.);
- *Realtime Adaptive Streaming LLC v. Adobe Systems, Inc.*, No. 1:18-cv-10355 (D. Mass.);
- *Realtime Adaptive Streaming LLC v. Apple Inc.*, No. 1:17-cv-02869 (D. Colo.);
- *Realtime Adaptive Streaming LLC v. Netflix, Inc.*, No. 1:17-cv-01692 (D. Del.)

- *Realtime Adaptive Streaming LLC v. Sony Electronics Inc.*, 1:17-cv-01693 (D. Del.);
- *Realtime Adaptive Streaming LLC v. Polycom, Inc.*, 1:17-cv-02692 (D. Colo.);
- *Realtime Adaptive Streaming LLC v. Brightcove*, 1:17-cv-01519 (D. Del.);
- *Realtime Adaptive Streaming LLC v. Haivision Network Video Inc.*, 1:17-cv-01520 (D. Del.);
- *Realtime Adaptive Streaming LLC v. Cisco Systems, Inc.*, 6:17-cv-00591 (E.D. Tex.);
- *Realtime Adaptive Streaming LLC v. Hulu, LLC*, 2:17-cv-07611 (C.D. Cal.);
- *Realtime Adaptive Streaming LLC v. EchoStar Technologies, LLC*, 6:17-cv-00567 (E.D. Tex.);
- *Realtime Adaptive Streaming LLC v. Amazon.com, Inc.*, 6:17-cv-00549 (E.D. Tex.);
- *Realtime Adaptive Streaming LLC v. Sling TV LLC*, 1:17-cv-02097-CBS (D. Colo.);
- *Realtime Data LLC d/b/a IXO v. EchoStar Corp.*, 6:17-cv-00084 (E.D. Tex.);

- *Realtime Adaptive Streaming LLC v. Comcast Cable Commc'ns, LLC*, 1:18-cv-01446 (D. Colo.);
- *Realtime Adaptive Streaming LLC v. Charter Commc'ns, Inc.*, 1:18-cv-01345 (D. Colo.);
- *Realtime Adaptive Streaming LLC v. Cox Commc'ns, Inc.*, 8:18-cv-00942 (C.D. Cal.);
- *Realtime Adaptive Streaming LLC v. LG Elecs. Inc.*, 6:18-cv-00215 (E.D. Tex.);
- *Realtime Adaptive Streaming LLC v. Advanced Micro Devices, Inc.*, 1:18-cv-01173 (D. Colo.);
- *Realtime Adaptive Streaming LLC v. Intel Corp.*, 1:18-cv-01175 (D. Colo.);
- *Realtime Adaptive Streaming LLC v. Mitel Networks, Inc.*, 1:18-cv-01177 (D. Colo.);
- *Realtime Adaptive Streaming LLC v. Avaya Inc.*, 1:18-cv-01046 (D. Colo.);
- *Realtime Adaptive Streaming LLC v. Broadcom Corp.*, 1:18-cv-01048 (D. Colo.);
- *Realtime Adaptive Streaming LLC v. Google LLC*, 2:18-cv-03629 (C.D. Cal.);

- *Realtime Adaptive Streaming LLC v. Wowza Media Systems LLC*, 1:18-cv-00927 (D. Colo.);

The '535 patent is also involved in the following IPR proceedings pending at the PTAB. Petitioner is not a party to any of the following IPR proceedings:

- *Unified Patents Inc. v. Realtime Adaptive Streaming, LLC*, IPR2018-00883
- *Hulu, LLC et al. v. Realtime Adaptive Streaming LLC*, IPR2018-01169
- *Hulu, LLC et al. v. Realtime Adaptive Streaming LLC*, IPR2018-01170
- *Sling TV LLC et al. v. Realtime Adaptive Streaming LLC*, IPR2018-01332
- *Sling TV LLC et al. v. Realtime Adaptive Streaming LLC*, IPR2018-01342

Additionally, U.S. Patent Application No. 15/382,263 is pending and claims priority through the '535 patent.

This identification of related matters is based on information that is currently known to Petitioner based on a reasonably diligent search of publicly available materials. Patent Owner may be aware of additional proceedings—including proceedings before the Patent Trial and Appeal Board (“the Board”) or otherwise before the United States Patent and Trademark Office (“the Office”)—relating to

patent claims encompassing similar subject matter or raising similar issues to those involved here.

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D. Service Information

Petitioner consents to service by email on the following email address: Cisco-Realtime-IPRs@winston.com.

II. PETITIONER'S STANDING

Petitioner certifies that the '535 patent is available for IPR, Petitioner does not own the '535 patent, and Petitioner is not barred or estopped from requesting this proceeding. The '535 patent was first asserted in a Complaint served on Petitioner on October 19, 2017, making the Petition timely under 35 U.S.C. § 315(b).

III. RELIEF REQUESTED

Cisco requests *Inter Partes* Review under 35 U.S.C. §§ 311-319 and 37 C.F.R. §§ 42.1, *et seq.* of claims 1-6, 8-12, 14-17, 19, 21, 22, 24 of U.S. Patent No. 8,934,535, and cancellation of these claims because they are unpatentable.

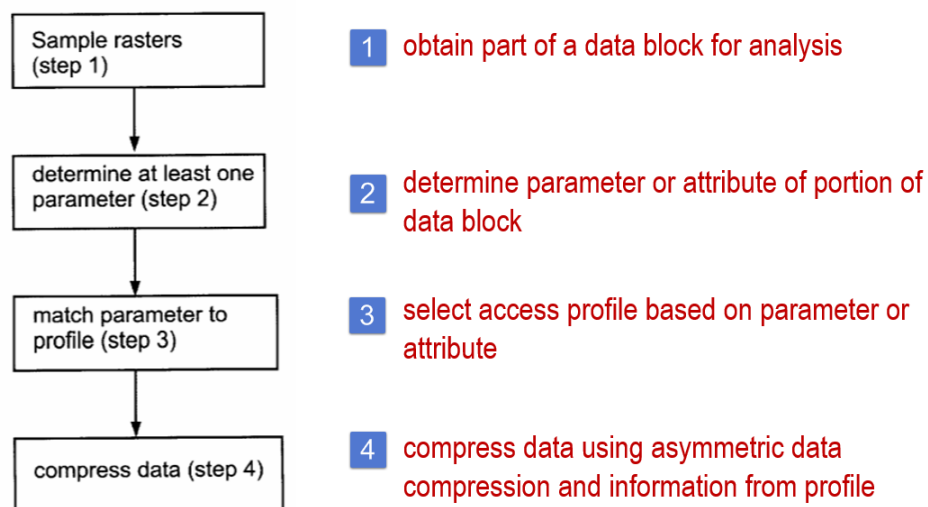
IV. SUMMARY OF REASONS FOR RELIEF REQUESTED

Claims 1-6, 8-12, 14-17, 19, 21, 22, and 24 of the '535 patent are unpatentable over prior art references that were not cited to, or considered by, the Office in allowing the claims of the '535 patent. Indeed, of the references relied upon in this Petition, just one was cited during prosecution of the '535 patent.

The claims of the '535 patent are directed to methods for evaluating data to be compressed and then selecting an asymmetric compression technique to compress the data. *See, e.g.*, Ex. 1001, cl.1. Method claim 1 requires determining a parameter or attribute of a video data block, selecting an access profile based on the parameter or attribute, and then compressing the block using asymmetric data compression and information from the access profile that indicates the compressor(s) to apply. *Id.* Method claim 15 is similar, but lacks the concept of an access profile, and adds a step of storing the compressed data blocks. *Id.*, cl.15. The claimed features were known and obvious over the prior art.

The '535 patent does not purport to invent any new compression algorithm; instead it operates using asymmetric compression algorithms long known in the prior

art. *See* Ex. 1002, ¶¶ 34-39, 50. For example, ubiquitous video encoding techniques, MPEG-1 and MPEG-2, were referred to as “notoriously asymmetric” long before the earliest filing date. Ex. 1010, p.7; Ex. 1002, ¶¶ 40-42. And, references like Dvir disclose that “current multimedia data compression methods are most efficient when adjusted for the type of multimedia data being transmitted.” Ex. 1007, 2:11-13. Dvir’s methods anticipate—or at the very least render obvious—many of the challenged claims of the ’535 patent. Dvir’s Figure 1b, annotated below, shows many aspects of the challenged claims:



Dvir discloses transmitting MPEG-compressed data to a remote display. Further, persons of ordinary skill in the art (“POSITA”) knew that MPEG improved both storage *and* transmission of video data. Ex. 1013, 1:48-52, Ex. 1019, p.107, Ex. 1022, 1:12-18; Ex. 1002, ¶ 43. Using Dvir’s techniques and including data storage would have been an obvious, and straightforward application of Dvir’s

techniques for their intended purpose—*i.e.*, compression of video data based on the type of data to be displayed.

As shown in detail below, the challenged claims recite no more than the simple, straightforward combination of known prior art methods used for their intended purposes. Thus, the Board should cancel the challenged claims.

V. SUMMARY OF THE '535 PATENT

The '535 patent relates to data compression and decompression methods. Ex. 1001, Abstract. It explains that data compression was known to have “unique benefits” in reducing data transmission time and allowing for more data to be stored in a fixed memory size. *Id.*, 4:20-27. There were several known types of data compression, including asymmetrical compression (where “the execution time for the compression and decompression routines differ significantly”) and symmetrical compression (where those execution times are “substantially similar”). *Id.*, 9:60-10:10.

The '535 patent does not purport to invent any new compression algorithm. Instead, it describes a system that analyzes data (*e.g.* to determine a data type), and then selects between one or more known compression algorithms. Specifically, it discloses using “data profiles” to “determine which compression algorithms” to apply. *Id.*, 11:6-8. The data profiles may “associate[] different data types (based on, *e.g.*, a file extension) with preferred one(s) of the compression algorithms.” *Id.*,

11:35-38. The patent provides an example of this association between access profiles and compression algorithms:

Access Profile	Example Data Types	Compression Algorithm	Compressed Data Characteristics	Decompression Algorithm
1. Write few, Read many	Operating systems, Programs, Web sites	Asymmetrical (Slow compress)	Very high compression ratio	Asymmetrical (Fast decompress)
2. Write many, Read few	Automatically updated inventory database	Asymmetrical (Fast compress)	Very high compression ratio	Asymmetrical (Slow decompress)
3. Similar number of Reads and Writes	User generated documents	Symmetrical	Standard compression ratio	Symmetrical

Id., col.12.

VI. PROSECUTION HISTORY

The '535 patent application, filed on September 20, 2013, ultimately claims priority to a provisional dated February 13, 2001. Ex. 1001, p.1.

During prosecution, applicant (Realtime's parent company) submitted 170 pages of Information Disclosure Statements ("IDS") disclosing over 1500 prior art references. The first and only substantive rejection by the examiner was non-final and issued February 26, 2014, rejecting certain claims under § 112 grounds, rejecting certain claims over U.S. Patent No. 6,216,157 ("Vishwanath"), and allowing 13 claims as is or if rewritten in independent form. Ex. 1005, pp.269-79.

Applicant responded on May 27, 2014, amending or canceling all pending claims, and adding seven new claims. Applicant stated it was amending claims to recite features included in dependent claims the examiner indicated would be allowable if rewritten in independent form. *Id.*, p.431-48. Realtime made no argument with respect to Vishwanath.

After several further claim amendments, the final Notice of Allowance issued December 10, 2014, without any further substantive prosecution. *Id.*, p.585-89.

VII. IDENTIFICATION OF THE CHALLENGE, STATUTORY BASIS FOR THE CHALLENGE, AND CLAIM CONSTRUCTION

A. Challenged Claims

Claims 1-6, 8-12, 14-17, 19, 21, 22, and 24 of the '535 patent are challenged.

B. Claim Construction

The challenged claims should be given their broadest reasonable interpretation (“BRI”) in light of the specification. *See Cuozzo Speed Techs., LLC v. Lee*, 136 S.Ct. 2131 (2016). Additionally, because the constructions proposed herein are based on the BRI, they do not necessarily apply to proceedings using different claim construction standards. *See Samsung Electronics Co., Ltd v. Virginia Innovation Sciences, Inc.*, IPR2013-00569, Paper 9 at *2, Oct. 30, 2013.

1. “data block”/“data blocks” (all challenged claims)

“Data block” means “*a single unit of data, which may range in size from more than one bit through complete files or collections of files.*” A similar

construction was adopted for other Fallon patents in other proceedings. Ex. 1015, p.40. The only difference is that because a single bit cannot be compressed, as required in the '535 claims, the size of the “data block” is limited to “more than one bit.”

Though “data block” is not expressly defined in the specification, U.S. Patent No. 6,195,024, which the '535 patent incorporates by reference, supports the proposed construction. Ex. 1001, 5:33-38; *see Advanced Display Sys., Inc. v. Kent State Univ.*, 212 F.3d 1272, 1282 (Fed. Cir. 2000) (“[i]ncorporation by reference” integrates “material from various documents into a host document”). The '024 patent states that “the system processes the input data stream in data blocks that may range in size from individual bits through complete files or collections of multiple files.” Ex. 1014, 15:6-9. “Data blocks” means more than one “data block.”

2. “access profile” (claims 1 and 14)

“Access profile” means “*a profile (1) having information used in data compression and (2) being associated with one or more characteristics of data to be compressed.*”¹ The claim language reveals that an access profile includes information used in compression and is chosen based on some parameter or attribute

¹ This construction is provided under the BRI. Cisco may later demonstrate that, under *Phillips*, a narrower construction is proper.

of data to be compressed. *See* Ex. 1001, cl.1 (“selecting an access profile . . . based upon the determined parameter or attribute”; “compressing . . . using . . . information from the selected access profile . . .”), cl.14 (same). The ’535 patent likewise supports that the “access profile” contains these attributes. The specification demonstrates that access profiles “enable[] the controller to determine a compression routine that is associated with a data type of the data to be compressed.” Ex. 1001, 8:4-9. Access profiles “enable the controller to select a suitable compression algorithm.” *Id.*, 8:9-11. The ’535 patent explains that access profiles can be associated with the type of data to be compressed (e.g., website, operating system, application program, database, word processing document, spreadsheet). *Id.*, 12:1-46. Based on the intrinsic evidence, a POSITA would understand the BRI of “access profile” to reflect that: (1) it must have information used in data compression, and (2) it must be associated with characteristics of the data, such as data type or access frequency.

3. *“asymmetric data compression” (claims 1, 10, and 12);
“asymmetric compressors” (claims 15, 16, 24)*

Applicants defined “**asymmetric data compression**” to mean “a compression algorithm in which the execution time for the compression and decompression routines differ significantly,” under which either “the compression routine is slow and the decompression routine is fast or the compression routine is fast and the decompression routine is slow.” Ex. 1001, 9:63-10:2. This definition is

controlling—Applicants acted as lexicographers by explicitly stating that “asymmetrical data compression . . . is referred to herein as,” clearly signaling their intent to so define the term. *See Renishaw PLC v. Marposs Societa’ per Azioni*, 158 F.3d 1243, 1249 (Fed. Cir. 1998) (“the definition selected by the patent applicant controls” when the applicant provides “an explicit definition in the specification for a claim term”). Therefore, “**asymmetric data compression**” means “*a data compression algorithm in which the execution time for the compression and decompression routines differ significantly.*” Accordingly, “**asymmetric compressor**” means “*a compressor that applies asymmetric data compression*” as that term is construed herein.

C. Summary of Grounds For Trial

The following prior art is presented as a basis for cancelling the challenged claims: (1) U.S. Patent No. 6,557,001 to Dvir et al. (“**Dvir**”) (Ex. 1007); (2) U.S. Patent No. 5,845,083 to Hamadani et al. (“**Hamadani**”) (Ex. 1013); (3) U.S. Patent No. 7,257,158 to Figuredo et al. (“**Figueredo**”) (Ex. 1020); (4) U.S. Patent No. 5,675,789 to Ishii et al. (“**Ishii**”) (Ex. 1021); (5) U.S. Patent No. 5,990,955 to Koz (“**Koz**”); and (6) U.S. Patent No. 6,341,196 to Ando et al. (“**Ando**”).

The following grounds for trial are presented:

- **Ground 1:** Claims 1-2, 9-10, and 14 are unpatentable under § 102(e) as being anticipated by Dvir and under § 103(a) as being obvious over Dvir and Koz;
- **Ground 2:** Claims 3-4 and 11 are anticipated by Dvir under § 102(e) and obvious over the combined teachings of Dvir and Ando with or without Koz;
- **Ground 3:** Claims 5-6, 12, 15-17, 19, and 22 are unpatentable under § 103(a) as being obvious over the combined teachings of Dvir and Hamadani with or without Koz;
- **Ground 4:** Claim 21 is unpatentable under § 103(a) as being obvious over the combined teachings of Dvir, Hamadani, and Figueredo with or without Koz; and
- **Ground 5:** Claims 1, 8, 15, and 24 are unpatentable under § 103(a) as being obvious over the combined teachings of Ishii in view of Koz.

D. All Grounds Are Based On Prior Art Patents

Dvir was filed as a U.S. patent application on November 12, 1999 and issued as a patent, making it prior art under § 102(e). Ex. 1007, cover.

Hamadani issued as a U.S. patent on December 1, 1998, making it prior art under § 102(b). Ex. 1013, cover.

Ando was filed as a U.S. patent application on May 14, 1999 and issued as a patent, making it prior art under § 102(e). Ex. 1026, cover.

Figueredo was filed as a U.S. patent application on May 17, 1999 and issued as a patent, making it prior art under § 102(e). Ex. 1020, cover.

Ishii issued as a U.S. patent on October 7, 1997, making it prior art under § 102(b). Ex. 1021, cover.

Koz was issued as a U.S. patent on November 23, 1999, making it prior art under § 102(b). Ex. 1022, cover.

E. Grounds For Trial Are Not Cumulative Of Other Challenges and This is Petitioner's First Challenge

This is Cisco's first challenge to the claims of the '535 patent. This Petition, and the grounds presented herein, are not cumulative of other challenges currently pending, which were filed by unrelated parties without input from Cisco and relied on other prior art and/or different prior art combinations. *See* IPR2018-00883, IPR2018-01169, IPR2018-01170, IPR2018-01332, and IPR2018-01142. For example, Hamadani, Ando, and Figueredo have not been cited in any previous petition before the Board. Additionally, none of the references relied upon in this Petition were applied against the challenged claims during prosecution. Indeed, just one reference (Ishii) was even cited during prosecution. Finally, no patent owner preliminary response or institution decisions have been filed in any other pending

IPRs. The Board should resolve the non-cumulative issues presented herein and not exercise discretion under §§ 314(a), 325(d) to deny this Petition.

VIII. ORDINARY SKILL AND KNOWLEDGE OF A POSITA

A. POSITA

As of February 2001 (earliest possible filing date), a POSITA in the field of the '535 patent would have had (1) a bachelor's degree in computer science, computer engineering, electrical and computer engineering, electrical engineering, or electronics and four years of experience working with data compression; or (2) a graduate degree focusing on data compression and two years of experience working with data compression. *See* Ex. 1002, ¶¶ 29-33. Additional education or industrial experience could compensate for a deficit in one of the prior requirements. *Id.* This level of ordinary skill is reflected by references cited herein, the state of the art, and Dr. Havlicek's experience in academia and work on data compression systems. *Id.* Reference to a POSITA herein refers to a person with these or similar qualifications.

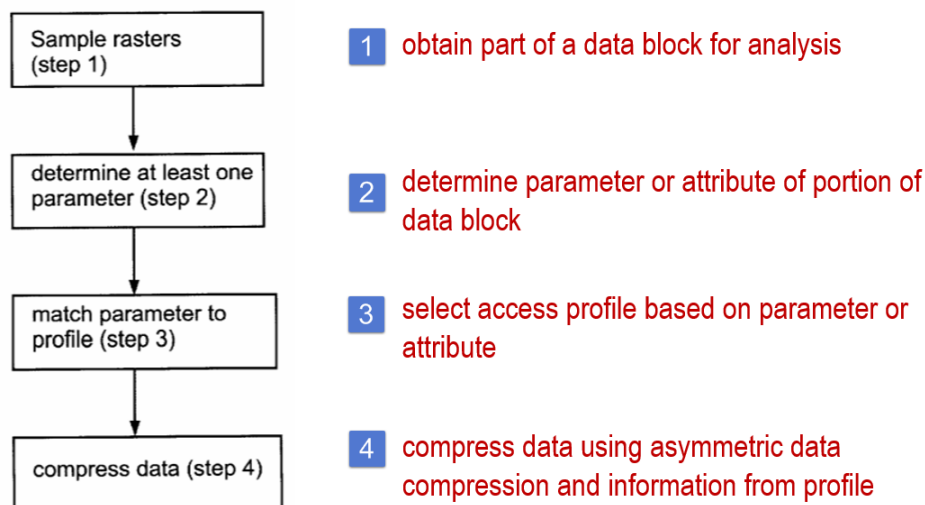
B. Technical Background

By February 2001, data compression was a mature field. Numerous techniques for encoding video data were known, as the '535 patent admits, and could trace their origins back to the 1940s. Ex. 1002, ¶¶ 34-39, Ex. 1001, 5:1-5. For example, MPEG-2 was a known video compression standard that was asymmetric because "encoding requires substantially more computational power than decoding." Ex. 1008, p.1. The prior art also disclosed that data compression had benefits in both

storing *and* transmitting data, which the '535 patent again admits. Ex. 1002, ¶ 43; Ex. 1022, 1:12-18; Ex. 1001, 2:44-46. The '535 patent does not purport to describe any new compression algorithm, but only describes methods for selecting and using known compression algorithms.

IX. SUMMARY OF THE PRIOR ART

Before the earliest filing date, it was well known in the art that a system could select a compression algorithm based on data type, network conditions, and/or storage space available. For example, Dvir discloses a system for “rapid video data compression and transmission.” Ex. 1007, Abstract. Specifically, Dvir identified a need for “automatically selecting a particular type of multimedia data compression method, according to the type of multimedia data which is to be transmitted . . . such that multimedia data is efficiently compressed.” *Id.*, 2:43-46. Dvir addressed this need by disclosing a system with a “compression profile manager” that contained different profiles associated with different compression algorithms. *Id.*, Fig. 1a. According to Dvir, that system samples video data to determine a parameter, then identifies the profile associated with that parameter, and then performs compression using the algorithm associated with the profile:



Id., Fig. 1b (annotated), 2:64-3:8. Dvir specifically discloses the use of MPEG encoding. *Id.*, 5:14-22. Koz discloses further implementation details of MPEG encoding, including that “MPEG is asymmetric-compression requires more effort than decompression.” Ex. 1022, 2:10-11. Dvir further discloses that it may be used to transmit data from a DVD. *Id.*, 5:45-51. And Ando discloses further implementation details of DVD, including that video is stored on DVDs as multiple files. Ex. 1007, 1:22-27 (discussing “files stored . . . on the DVD storage medium”).

Hamadani discloses a system for compressing video data, like Dvir, and explains that video is compressed for either transmission or storage. Ex. 1013, 1:13-20, 3:62-65. As one example, Hamadani discloses that data may be compressed and then stored so that a user can access that data at a later time. *Id.*, 7:48-8:2.

Figueredo discloses a video-on-demand system that, like Hamadani, stores video for transmission to the user at a later time. Ex. 1020, Abstract, 4:6-14.

Specifically, Figueredo explains that video may be transmitted later based on network conditions. *Id.*, 7:28-38.

Ishii describes a “file compression processor” that compresses image data. Ex. 1021, Abstract. Ishii explains that it selects the compression algorithm based on the available space in the storage device. *Id.*, 1:49-55. Koz, as noted above, describes compressing video data using MPEG encoding. Ex. 1022, 2:10-11.

X. THE CHALLENGED CLAIMS ARE UNPATENTABLE

A. Ground 1: Claims 1-2, 9-10, and 14 Are Anticipated By Dvir or Alternatively Rendered Obvious By Dvir and Koz

Dvir anticipates claims 1-3, 9-10, and 14. In the alternative, Dvir and Koz would have rendered claims 1-3, 9-10, and 14 obvious.

1. Claim 1

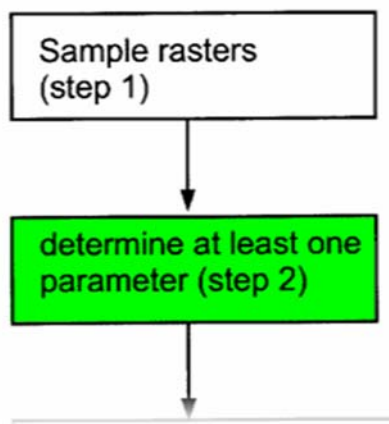
Dvir discloses, and therefore anticipates, each limitation of claim 1. To the extent that the Board finds that Dvir fails to disclose that its compression is “asymmetric,” Dvir in view of Koz discloses this element because Koz discloses that MPEG compression (the type of compression used in Dvir) is asymmetric, and a POSITA would have been motivated to combine these references for the reasons discussed below in claim element [1Ci].

a. [1P]: “A method comprising:

Dvir discloses a “method for rapid video data compression,” and thus discloses this part of the claim. *See* Ex. 1007, 1:12-16 (referring to “a . . . method for multimedia data compression and transmission”), 2:42-48; 2:66-3:21; 4:22-24.

b. [1A]: “determining a parameter or attribute of at least a portion of a data block having audio or video data;”

Dvir discloses a step of determining a parameter of at least a portion of a data block having video data:



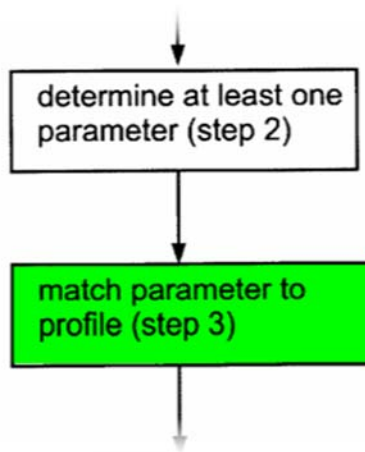
Ex. 1007, Fig. 1b (excerpt); *see also, e.g., id.*, Abst. (referring to “***video data***” (emphasis added)²), 5:5:3-31; Ex. 1002, ¶¶ 115-126. Dvir explains that “a plurality of such ***parameters***” should be determined including: “motion in the screen,” “unique colors in the screen,” “presence of static dark thin rows of pixels or large static blocks.” Ex. 1007, 5:35-41, Fig. 1b (step 2).

² All emphasis is added unless otherwise noted.

Dvir's step of "determining a parameter" is performed on a sample of "groups of rasters," which are "a block of 8 x 8 pixels." *Id.*, 5:30-34. An exemplary parameter, "motion on the screen," is determined between "one frame and the next frame." *Id.*, 5:39-41. The one or two frames (depending on whether motion is determined) is a "data block" because frames or pairs of frames are single units of data that range in size from individual bits to complete files. Ex. 1002, ¶ 119. Additionally, the entire video stream is also a "data block" because it is a unit of data that can range in size from more than one bit to files or collections of files.. Therefore, Dvir determines parameters or attributes of data blocks having video data.

- c. [1B]: "selecting an access profile from among a plurality of access profiles based upon the determined parameter or attribute;"

Dvir discloses this limitation because, as reflected in "step 3" of Figure 1b of Dvir, "the plurality of parameters is matched to a particular compression profile, which is then selected by compression profile manager." Ex. 1007, 5:42-65. Dvir explains that when the parameters "indicate that a DVD movie is being transmitted" (e.g. "thousands of unique colors" or "considerable movement between frames") "[t]he appropriate compression profile for the DVD movie would then be selected." Ex. 1007, 5:42-65. Dvir's selection of a profile is thus "based upon" the determined parameter(s).



Ex. 1007, Fig. 1b (excerpt). There are multiple profiles, such as those associated with DVDs, “television video stream[s],” and “3-D video game video data,” *Id.*, 5:51-52, 6:16-41, and thus, Dvir teaches selecting from “among a plurality of access profiles.”

Dvir’s profiles are “access profiles” because they include information used in data compression and are associated with characteristics of the data—such as data type or the application that generated the data. Ex. 1002, ¶¶ 127-132; Ex. 1007, 6:16-41 (disclosing exemplar profiles for television video, word processor screen streams, and 3D video game video). Dvir’s access profiles include information about the number of frames in a group, type of encoding, size of the motion vectors, and filtering to be applied in connection with the encoding. Ex. 1007, 5:57-65, 6:16-41 (describing information included as part of the profile that is used during data compression); Ex. 1002, ¶ 131. Additionally, Dvir’s access profiles are associated with one or more characteristics of the data such as unique colors, static dark lines,

level of motion, and the data type. Ex. 1007, 2:11-20, 2:53-63, 5:36-41, 5:57-65, 6:16-41, 6:64-66. Dvir explains that the disclosed system selects the “type of multimedia data compression” based on detected “characteristics of the multimedia data,” which allows the system to “select[] the multimedia data compression profile according to the character of the data.” Ex. 1007, 2:58-63.

- d. [1Ci]: “compressing the at least the portion of the data block with one or more compressors using asymmetric data compression and information from the selected access profile,”

Dvir discloses this limitation. Dvir explains that “[i]n step 4, the compression profile is set to determine the particular video compression method for compressing the video data. The data is *then compressed* and transmitted.” Ex. 1007, 6:42-45. “[T]he *MPEG compression methods are preferred* . . . as they feature different profiles and levels” *Id.*, 5:57-60; *see also id.* 6:5-41 (describing various profiles and information associated with those profiles), Figs. 1a, 2, 3a-3c (showing MPEG encoders and/or decoders).

Dvir’s teaching of MPEG encoders teaches an asymmetric data compression technique. Dvir discloses that the data stream generated by a specific application (including the rasters sampled to determine the data parameters) is compressed using an MPEG compressor, which was known by POSITAs to be “notoriously asymmetric” as confirmed by numerous publications. Ex. 1010, p.7; *see also* Ex. 1008, p.1 (“MPEG uses an asymmetric coding model where encoding requires

substantially more computational power than decoding.”); Ex. 1009, p.4 (“the MPEG algorithm is notoriously asymmetric”); Ex. 1011, p.1 (“MPEG is a asymmetric codec.”); Ex. 1012, p.1 (“MPEG is asymmetric”); Ex. 1002, ¶ 137. As further support, a POSITA would have combined Dvir with Koz, which provides further implementation details of MPEG encoding, as discussed below. *Infra* § X.A.1.d.i.

Dvir also discloses that the compression uses information from the selected access profile because Dvir’s profiles define information such as the number of frames in a group, type of encoding, size of the motion vectors, and filtering to be applied in connection with the encoding. *See, e.g.*, Ex. 1007, 5:57-65, 6:16-41 (describing information included as part of the profile that is used during data compression). This information is used in encoding video data by Dvir’s system.

i. A POSITA Would Have Been Motivated to Combine Dvir and Koz

A POSITA would have been motivated to combine the teachings of Dvir and Koz to provide further implementations details for the MPEG encoders used in Dvir.

Dvir explains that the preferred encoder for use with the disclosed methods is “the MPEG group of compression methods.” Ex. 1007, 5:17-22. A POSITA would have recognized that Dvir does not disclose certain details of MPEG encoding or decoding since it was a well-known technology by the late 1990’s. Ex. 1002, ¶ 140.

Koz provides a background description of certain functionality used in MPEG compression. Ex. 1022, 1:66-9:25. One aspect of MPEG compression Koz teaches is that “*MPEG is asymmetric*—compression requires more effort than decompression.” *Id.*, 2:8-10. A POSITA would have thus understood from Koz that the MPEG compression is asymmetric data compression.

Both Dvir and Koz, therefore, describe systems using MPEG compression, and describe implementations of video encoding techniques that rely upon MPEG compression. Thus, a POSITA seeking to implement Dvir’s methods would have been motivated to look to a reference providing more information on MPEG encoding, such as Koz, due to Dvir’s disclosure of MPEG encoding. A POSITA would have found it obvious to implement an MPEG compression routine like that in Koz, which performs asymmetric data compression. Ex. 1002, ¶ 476. Thus, the combination of teachings would have resulted in a system that operated as contemplated by Dvir, using the techniques expressly suggested by Dvir, and that would have resulted in asymmetric data compression using asymmetric MPEG data compressors as taught by Koz. *Id.* Use of the MPEG compression technology in connection with Dvir would have not resulted in any unexpected results, particularly since Dvir expressly suggests the use of MPEG compression schemes.

- e. [1Cii]: “the information being indicative of one or more compressors to apply to the at least the portion of the data block.”

The information in Dvir’s profiles discloses this limitation. Ex. 1001, cl.1. Because Dvir teaches “associating one of a plurality of different multimedia data compression procedures with each type of multimedia data according to the at least one characteristic for optimal compression of the multimedia data to form the compression profile,” Ex. 1007, 3:15-19, Dvir discloses that the information in the profile indicates the compressor—i.e., the “multimedia data compression procedure” to apply to a specific data block. The association of “different data compression procedures” according to characteristics of the data “to form the compression profile” shows that the information in the profile (discussed above) indicates the data compressor to apply to that block. Ex. 1002, ¶¶ 144-147; *see also id.*, 2:28-34, 2:64-3:3 (“providing a plurality of *different multimedia compression procedures, each of the compression procedures being associated with a profile of characteristics of the multimedia data*”), 5:3-13 (“*a plurality of compression profiles, each of which is suitable for a particular type of display data which is produced by a software application*”).

2. Claim 2

Dvir teaches that “the data block is from among a plurality of data blocks, and wherein the compressing comprises: compressing the plurality of data blocks to

create the one or more compressed data blocks.” Ex. 1001, cl.2. Dvir teaches the following hierarchy of data, from smallest to largest: (1) pixels, (2) groups of rasters (i.e., 8 x 8 block of pixels), (3) a frame, (4) a pair of frames, and (5) a video data stream. *See* Ex. 1007, 5:24-35, 5:45-51. A video stream from a DVD includes a large number of frames per second and thus includes “a plurality of data blocks;” each of which is compressed using MPEG. Ex. 1007, 5:57-60, 5:49-51, 6:42-45, Figs. 1a, 2, 3a, 3b, 3c; Ex. 1002, ¶ 152. Compression of frames of video data (data blocks) results in the creation of “one or more compressed data blocks” which form compressed video data blocks. Ex. 1002, ¶¶ 154-158; Ex. 1007, 7:1-37, Fig. 2. This compressed video data is then transmitted to a remote monitor for decompression and viewing according to Dvir. Ex. 1007, 6:42-45, 7:33-37.

3. *Claim 9*

Dvir teaches that “the determining of the parameter or attribute of the at least the portion of the data block excludes determining based only upon a reading a descriptor of the at least the portion of the data block.” Dvir explains that parameters are determined by sampling a “group of rasters” (an 8 x 8 group of pixels). Ex. 1007, 5:30-35. Dvir’s determined parameters include “motion in the screen,” “unique colors in the screen,” or “presence of static dark thin rows of pixels or large static blocks.” *Id.*, 5:30-41. These parameters are determined by looking at the “groups of

rasters” rather than only reading “a descriptor” of the data block. *Id.*; Ex. 1002, ¶ 161.

4. *Claim 10*

Dvir teaches that “the at least the portion of the data block is from among a plurality of data blocks,” for the reasons discussed with respect to claim 2. *Supra*, § X.A.2. Dvir’s sampled “groups of rasters” are from among one or two frames in a stream of frames. *Id.*

Dvir also teaches that the compression of the data stream includes “compressing at least a portion of the plurality of data blocks with the one or more compressors using asymmetric data compression and the information,” as explained in connection with the discussion of limitation 1[C][i], above. *See supra* § X.A.1.d. Finally, Dvir teaches that the result of the compression is to “create the one or more compressed data blocks.” Specifically, Dvir explains that “the MPEG format uses three different types of frames: I, B and P.” Ex. 1007, 5:66-6:4. Dvir also explains that various profiles lead to different groups of frames. *Id.*, 6:5-41. These groups of frames constitute one or more compressed data blocks since groups of frames are units of compressed data in MPEG-2 coding. *See* Ex. 1002, ¶ 165. Therefore, Dvir discloses all aspects of claim 10. *Id.*, ¶ 166.

5. *Claim 14*

Dvir anticipates claim 14. Dvir in view of Koz also render claim 14 obvious.

- a. [14P]: A method comprising:

Supra feature [1P].

- b. [14A]: “determining a parameter or attribute of at least a portion of a data block;”

Supra feature [1A].

- c. [14B]: “selecting an access profile from among a plurality of access profiles based upon the determined parameter or attribute;” and

Supra feature [1B].

- d. [14Ci]: “compressing the at least the portion of the data block with one or more compressors utilizing information from the selected access profile to create one or more compressed data blocks,”

Supra feature [1Ci].

- e. [14Cii]: “the information being indicative of the one or more compressors to apply to the at least the portion of the data block,”

Supra feature [1Cii].

- f. [14[D]]: “wherein the one or more compressors utilize at least one slow compress encoder and at least one fast decompress decoder; and”

As explained above regarding claim 1, feature [1Ci], Dvir discloses MPEG, an asymmetric compression scheme. Ex. 1007, 5:57-60, 6:42-45; Figs. 1a, 2, 3a, 3b, 3c; Ex. 1010, p.7 (stating that MPEG compression is “notoriously asymmetric”); Ex. 1008, p.1 (“MPEG uses an asymmetric coding model where encoding requires substantially more computational power than decoding.”); Ex. 1009, p.4 (“the

MPEG algorithm is notoriously asymmetric”); Ex. 1011, p.1 (“MPEG is a asymmetric codec.”); Ex. 1012, p.1 (“MPEG is asymmetric”); Ex. 1002, ¶¶ 174-176. MPEG is asymmetric and has a “slow” compression encoder because it “require[s] substantially more computational power than decoding.” Ex. 1008, p.1; Ex. 1002, ¶¶ 174-176. Dvir’s MPEG decoder is a “fast decompress decoder” when compared with Dvir’s MPEG encoder. *Id.* Thus, Dvir’s disclosure of MPEG encoding schemes discloses this limitation of claim 14.

Further, to the extent that the Board finds that Dvir fails to disclose a “slow compress encoder” and a “fast decompress decoder,” Dvir in view of Koz discloses this element because Koz discloses that MPEG compression (the type of compression used in Dvir) is slower than decompression because “compression requires more effort than decompression.” Ex. 1022, 2:8-10. This reference to “more effort” for compression teaches that, relative to the decoding of the compressed stream, encoding the data to create the compressed stream is slower. Ex. 1002, ¶ 177. For the reasons explained above, a POSITA would have found it obvious to combine the teachings of Dvir and Koz because Koz provides implementation details for MPEG compression, which is the type of compression disclosed in Dvir. *Supra* § X.A.1.d.i.

- g. [14[E]]: “wherein compressing the at least the portion of the data block with the at least one slow compress encoder takes more time than decompressing the at least the portion of the data block with the at least one fast decompress decoder if the time were measured with the at least one slow compress encoder and the at least one fast decompress decoder running individually on a common host system.”

As explained in connection with feature 14[D], Dvir discloses MPEG compression, which used a slow compress encoder and a fast decompress decoder. At the very least, it would have been obvious to implement Dvir’s MPEG encoder and decoder in this manner based on the teachings of Koz. *Supra* Feature [14D], § X.A.1.d.i (motivation to combine Dvir and Koz). Because MPEG encoders were asymmetric and encoding “require[d] substantially more computational power than decoding,” Ex. 1008, p.1, a POSITA would have understood that if both encoding and decoding were run on a “common host system”³—e.g., a system that has the same processing power and speed—the encoder would take longer to execute and encode a data block than the decoder would take to decode the encoded data block. Ex. 1002, ¶¶ 178-181. This must be the case for an asymmetrical compression scheme in which the encoder is slower than the decoder. ; Ex. 1008, p.1 (“MPEG

³ The claim does not require the encoder and decoder to be implemented on the same host system. Instead, it merely says that “if” encoders and decoders were implemented on a “common host system” one would be faster than the other.

uses an asymmetric coding model where encoding requires substantially more computational power than decoding.”); Ex. 1009, p.4 (“the MPEG algorithm is notoriously asymmetric”); Ex. 1011, p.1 (“MPEG is a asymmetric codec.”); Ex. 1012, p.1 (“MPEG is asymmetric”).

B. Ground 2: Claims 3, 4, and 11 Are Anticipated by Dvir, or, In the Alternative Obvious Over the Combined Teachings of Dvir (With or Without Koz) and Ando

1. Motivation to Combine

A POSITA would have been motivated to combine the teachings of Dvir (with or without Koz) with Ando to provide further implementation details for DVDs used in Dvir.

Dvir explains that the video stream to be compressed may be a DVD video stream. Ex. 1007, 2:24-31, 5:45-51, 6:62-67. Dvir further explains that DVDs can store files. *See* Ex. 1007, 1:22-27 (“[C]omputers today can play music *stored in a variety of formats*, including *files stored* in the MP3 format on a CD, on a magnetic storage medium, or on the DVD storage medium as well as displaying video streams”). A POSITA would have understood that audio or video stored on a DVD would have been stored as a file and accessed by an application program (item 3 in Dvir). Ex. 1002, ¶ 189. Because DVD storage was commonly used by POSITAs at the time of Dvir, Dvir does not provide details about the format of video data stored on a DVD storage medium. *Id.*

A POSITA would have been motivated to look to Ando to understand further how DVD video is stored, because Ando provides an overview of certain aspects of the DVD or “Digital Versatile Disk” standard, which itself relies on the MPEG-2 standard used in Dvir’s technique. Ex. 1026, 1:25-28; Ex. 1007, 5:57-60. Ando explains that video data, such as the DVD video data disclosed by Dvir, is compressed and stored on a DVD in one or more files. Ex. 1026, 1:25-36, 1:61-67 (“[T]he directory structure of information (*data files*) recorded on an information storage medium is such that a subdirectory of video title set VTS . . . [is] connected to a root directory as shown in FIG. 1.”), 2:7-17, 3:30-35, 3:47-51 (“control data and video data are recorded in such a manner that they are *distributed over plural files*”), 4:1-6, FIG. 1.

Thus, a POSITA would have been motivated to combine Dvir’s DVD movies with the explanation of how DVD movies are stored in Ando. Ex. 1002, ¶¶ 190-192. Ando’s teachings relate to DVD, which, by the time of Dvir had become a known standard technique for storing video data. *Id.* It would not have taken more than ordinary skill to store video data using the DVD standard contemplated by Dvir as one or more files based on the teachings of Ando, which explain how to store video files in the DVD format. Ex. 1002, ¶ 192. Because this was the standard way to create a movie on DVD, it would have been readily apparent to store the movies referred to in Dvir as DVD movies in one or more files.

2. Claim 3

Because Dvir teaches a DVD video stream, Ex. 1007, 5:45-51, 6:62-67, Dvir teaches that “the plurality of data blocks comprises: one or more files,” since DVD video is stored on a “DVD storage medium” in one or more files, Ex. 1007, 1:22-27 (“[C]omputers today can play music *stored in a variety of formats*, including *files stored* in the MP3 format on a CD, on a magnetic storage medium, or on the DVD storage medium as well as displaying video streams”).

A POSITA would have understood that audio or video stored on a DVD would have been stored as a file on that DVD and accessed by an application program (item 3 in Dvir). Ex. 1002, ¶ 193. Accordingly, a POSITA would have understood that Dvir disclosed a plurality of data blocks that comprised “one or more files”—namely files stored on a DVD. Ex. 1002, ¶ 194. It also would have been obvious to store movies in MPEG-compressed format in one or more files on a DVD as suggested by Dvir based on Ando, the latter of which teaches that DVD video data is compressed and stored on a disk in one or more files. Ex. 1026, 1:25-36, 1:61-67, 2:7-17, 3:30-35, 3:47-51, 4:1-6, FIG. 1. Ando explains that the standardized DVD format stored video data in files. Ex. 1002, ¶ 196. Thus, it would have been obvious to store DVD movies in files on DVD according to the standard DVD format because that was the known and standardized way to store files. Thus, when those files were played back for display, the data blocks would comprise those video files. Ex. 1002,

¶ 197. As explained above, this combination of Dvir and Ando would have been obvious.

1. Claim 4

Dvir also discloses, and at the very least renders obvious, the requirement that “the one or more compressed data blocks comprise: one or more files.” As explained above, the input to Dvir’s MPEG encoder includes “one or more files” (or at the very least, it would have been obvious to implement Dvir such that the input blocks comprised one or more files), a POSITA would have understood that the compressed data blocks—which are merely a compressed representation of the original, uncompressed data block—represent the same “one or more files” as the original data block(s) represented. Ex. 1002, ¶ 199. If the files were different, then the data content played back after compression would not be a representation of the original data, but would instead represent something else, contrary to the purpose of the data compression techniques which seek to obtain a relatively accurate representation of the original video data (even though compression may be lossy). Therefore, Dvir discloses, or at the very least renders obvious, the subject matter of claim 4 too.

2. Claim 11

Dvir discloses all aspects of claim 11 because it discloses that “the plurality of data blocks or the one or more compressed data blocks comprise: at least a portion of a file.” In Dvir the “one or more compressed data blocks comprise: at least a

portion of a file,” for the reasons described in connection with claim 4, which recites that the “one or more compressed data blocks comprise: one or more files.” *See supra* § X.B.1.

C. Ground 3: Claims 5-6, 12, 15-17, 19, and 22 Are Obvious Over the Combined Teachings of Dvir (With or Without Koz) and Hamadani

Claims 5-6, 12, 15-17, 19, and 22 would have been obvious in view of the combined teachings of Dvir (with or without Koz) and Hamadani.

1. Motivation to Combine

A POSITA would have been motivated to combine the teachings of Dvir (with or without Koz) with Hamadani to store the video created in Dvir and provide for remote transmission of that video, as disclosed in Hamadani.

Both Dvir and Hamadani disclose compressing video data using MPEG video compression techniques. *See* Ex. 1007, 5:14-17, 5:57-61 (“the MPEG compression methods are preferred”), Fig. 1a; Ex. 1013, 2:9-11, 2:24-45 (an “advantage of the invention is in providing an MPEG encoding and decoding system”). A POSITA also knew that there were two principal, useful ways to use MPEG-compressed data: (1) transmit the compressed data to a remote location, or (2) store the compressed data for later use. Ex. 1002, ¶ 210. Hamadani teaches both of these uses. Ex. 1013, 1:13-20, 3:62-65 (“The compressed multimedia data may be loaded into a data storage 40 or supplied through a communication channel to a remote user.”); Ex.

1002, ¶ 211. Hamadani further discloses storing MPEG-compressed data in “an encoded multimedia storage 206,” so that it may be later requested by a user. Ex. 1013, 7:48-66. Another similarity between Hamadani and Dvir is that both teach compressing different types of data which includes, for example, data from “input sources 52, 54, or 56,” such as “image, graphics, or text.” Ex. 1013, 4:17-24; Ex. 1007, 2:21-26, 6:64-66 (referring to “tv,” “dvd” “text” or “graphics”).

Hamadani, like Dvir, discloses an encoding system in which the encoder is informed of the data type and compresses the data using MPEG video compression. *See* Ex. 1013, 4:19-28, 5:52-56, 6:65-6:18. Dvir recognizes that “[e]ach different type of display data therefore requires a different type of video data compression method for the most efficient compression of the transmitted data.” Ex. 1007, 2:28-31. Dvir accomplishes this by analyzing data in video frames to determine the nature of the video data. *Id.*, 5:36-41.

A POSITA reading Dvir would have been motivated to improve Dvir by implementing Hamadani’s storage and remote transmission features to Dvir’s compressed video, to attain the benefit of allowing the user to view compressed video at a later time of their choosing. Ex. 1002, ¶¶ 210-211; Ex. 1007, 2:28-30. A POSITA would have combined these teachings and would have arrived at predictable results, namely a multimedia encoding system that encoded multimedia video data using MPEG compression in an efficient manner. Ex. 1002, ¶ 212. As

discussed in more detail below, Dvir (with or without Koz) in view of Hamadani would have rendered claims 5-6, 12, 15-17, 19, and 22 obvious.

2. Claims 5 and 6

The prior art discloses the requirements of claims 5 and 6. Claim 5 requires “storing at least a portion of the one or more compressed data blocks in one or more files.” Claim 6 is broader than claim 5 in that it does not require storage “in one or more files.” Therefore, a showing that claim 5 would have been obvious also establishes claim 6 would have been obvious.

Storage of a compressed MPEG data stream in a file was commonplace. Ex. 1002, ¶ 214. Hamadani discloses both the storage and transmission of compressed data. Ex. 1013, 1:13-20, 3:62-65 (“The compressed multimedia data may be loaded into a data storage 40 or supplied through a communication channel to a remote user.”). Hamadani explains that MPEG-compressed data can be stored in “an encoded multimedia storage 206,” so that it may be later requested by a user. Ex. 1013, 7:48-66. The ’535 patent admits that “[f]iles are collections of . . . various data objects,” Ex. 1001, 5:60-61, and because files are just a collection of data or information that is treated as a unit, an encoded video stream including multiple frames was stored as a “file,” Ex. 1002, ¶ 219 (citing Ex. 1018 and definitions of “file”). Thus, the collection of video data stored on multimedia storage 206 would have been stored as a file.

Storing compressed video data as a file was common and predictable way to store data in a manner that allowed it to be accessed at a later time. Ex. 1002, ¶ 214. It therefore also would have been obvious to store the compressed video in a file because storing compressed videos as files using well-known file extensions, such as “.mpg” or “.mpeg” would have allowed multiple videos to be stored on Hamadani’s “encoded multimedia storage 206” and to be separately accessed and retrieved by the remote PCs (214). Ex. 1002, ¶¶ 215-218. Hamadani expressly suggests that “video on demand” systems allow subscribers to request “the presentation of a particular movie or video program.” Ex. 1013, 1:21-25.

Based on the foregoing, storing at least a portion of a data block, including storing the data block in one or more files would have been obvious based on the combined teachings of Hamadani and Dvir (with or without Koz). Storing MPEG-compressed data in files was commonplace, as shown by Hamadani. Ex. 1013, 1:13-20, 3:62-65. Indeed, storing compressed data, thereby increasing storage density, was one of the key contemplated uses of MPEG compression in the first place. *Id.*, ¶ 210; Ex. 1013, 4:36-39 (referring to 20-50 times compression using MPEG). As explained above, a POSITA would have therefore been motivated to use Hamadani’s storage systems with Dvir’s compressed video. *Supra* § X.C.1. Additionally, storing compressed data before transmission to a remote location would have had the benefits of allowing a complex encoding process to be performed, thereby

enhancing data compression, reducing transmission bandwidth needs, and allowing a user to request the compressed data be sent to a remote location on-demand. Ex. 1002, ¶¶ 215-217. These benefits were well-understood by February 2001 and would have led a POSITA to consider storing the compressed MPEG data, and storing such data in one or more files, based on Hamadani and Dvir. *Id.*, ¶¶ 213-222.

3. *Claim 12*

- a. [12A]: “The method of claim 1, wherein the compressing comprises:”

Dvir discloses the method of claim 1. *See supra* §V.B.1.

- b. [12Bi]: “compressing the at least the portion of the data block with the selected one or more asymmetric compressors to create one or more portions of the one or more compressed data blocks,

Dvir discloses “compressing the at least the portion of the data block with the selected one or more asymmetric compressors to create one or more portions of one or more compressed data blocks.” As explained in connection with feature [1Ci], Dvir discloses compressing the at least the portion of the data block with a particular MPEG compression technique selected based on the determined data parameters. *Supra* feature [1Ci] & § X.A.1.d. These MPEG compression techniques are asymmetric compression techniques. Compression with the appropriately selected profile and MPEG compression technique creates data blocks, such as groups of I, P, and B frames that are output from the MPEG compressor as compressed data

blocks. Ex. 1007, 5:66-6:4 (discussing use of I, P, and B frames in MPEG encoding). The MPEG compression techniques disclosed by Dvir thus creates one or more portions of the one or more compressed data block. Ex. 1002, ¶ 227; Ex. 1007, 6:5-41.

- c. [12Bii] “the at least the portion of the data block having been compressed with the selected one or more asymmetric compressors to create the one or more portions of the one or more compressed data blocks, and further comprising:”

As explained in connection with feature [12Bi], “the at least the portion of the data block is compressed with the selected one or more asymmetric compressors” and this results in the creation of “the one or more portions of the one or more compressed data blocks.”

- d. [12[C]]: “storing at least the one or more portions of the one or more compressed data blocks.”

As explained above in connection with the discussion of claims 5 and 6, a POSITA would have been motivated to combine Dvir and Hamadani to implement a method in which one or more portions of the one or more compressed data blocks are stored. *Supra* § X.C.1.

4. *Claim 15*

- a. [15P]: “A method, comprising:”

Dvir and Hamadani disclose methods. *Supra* feature [1P]; Ex. 1013, 3:6-20 (“In accordance with a method of the present invention . . .”).

- b. [15A]: “determining a parameter of at least a portion of a data block;”

Dvir discloses “determining a parameter of at least a portion of a data block.”

Supra feature [1A].

- c. [15B]: “selecting one or more asymmetric compressors from among a plurality of compressors based upon the determined parameter or attribute;”

Dvir discloses “selecting one or more asymmetric compressors from among a plurality of compressors based upon the determined parameter or attribute.” As discussed above, Dvir discloses a method that includes “detect[ing] the characteristics of the multimedia data to determine the character of the data, and then” selecting “the multimedia data compression profile, including the compression method according to the character of the data.” Ex. 1007, 2:57-63; *see also id.*, 2:64-3:8, 3:11-21, 4:29-34 (“[T]he type of multimedia data compression is selected by a profile manager, which detects the characteristics of the multimedia data to determine the profile of the data, and then which *selects the multimedia data compression method according to the profile.*”), 4:66-5:3 (“[C]ompression profile manager 7 can *select the particular type of video compression method* for compressing the display data.”), 6:42-45; Ex. 1002, ¶ 237. The selection of the compressor is based on the determined parameters. Ex. 1007, 4:29-34, 5:27-51, Fig. 1b; Ex. 1002, ¶ 237. Moreover, as discussed above, those skilled in the art would have understood that MPEG compression techniques are “notoriously asymmetric,”

as reflected in a number of publications. Ex. 1010, p.7; *see also* Ex. 1008, p.1; Ex. 1009, p.4; Ex. 1011, p.1; Ex. 1012, p.1; Ex. 1002, ¶ 237. And, a POSITA would have found the selection of an asymmetric compressor—namely an MPEG compressor—obvious based on the teachings of Koz as explained in connection with the discussion of claim 1, above. *Supra* feature [1Ci] & § X.A.1.d.

- d. [15C]: “compressing the at least the portion of the data block with the selected one or more asymmetric compressors to provide one or more compressed data blocks; and”

Dvir discloses “compressing the at least the portion of the data block with the selected one or more asymmetric compressors to provide one or more compressed data blocks.” Specifically, Dvir explains that “the compression profile is set to determine the particular video compression method for compressing the video data. ***The data is then compressed*** and transmitted.” Ex. 1007, 6:42-45; *see also id.*, 3:6-8. As discussed above in connection with the analysis of claim 1, a frame or pair or frames would have been understood to be a “data block.” *Supra* feature [1A]. As explained in connection with the discussion of feature [1A], “groups of rasters” would have been understood to be a portion of the data block. Ex. 1007, 5:31-34; Ex. 1002, ¶ 240. The frames, including the groups of rasters are compressed by Dvir’s asymmetric MPEG compression scheme selected based on the analysis of the video data and produce one or more compressed data blocks. *See, e.g.*, Ex. 1007, 5:66-6:41; Ex. 1002, ¶ 241.

- e. [15D]: “storing at least a portion of the one or more compressed data blocks.”

As explained above in connection with the discussions of claims 5 and 6, a POSITA would have found it obvious to combine Dvir and Hamadani to provide for storing the compressed data created in Dvir. A POSITA would have understood that MPEG compression was commonly used in both storage and transmission applications. *See supra* § X.C.1. Hamadani discloses examples in which compressed data blocks are either transmitted after compression or stored after compression and later transmitted upon request. Ex. 1013, 1:13-20, 3:62-65 (“The compressed multimedia data may be loaded into a data storage 40 or supplied through a communication channel to a remote user.”); Ex. 1002, ¶ 241. Reference is made to the complete discussion of claim 6, above, which has an identical limitation. *See supra* § X.C.2.

And, as explained further in connection with claims 5 and 6, and section X.C.2, above, storing MPEG-compressed data was commonplace and not inventive. There were many reasons to store MPEG-compressed data including increasing storage density, allowing a user to request compressed data on demand without the need to perform the computationally expensive task of encoding the data before transmitting it each time it is requested, and allowing use of a more complex encoding process to compress the data thereby enhancing data compression, reducing transmission bandwidth needs. Ex. 1002, ¶¶ 214-220. These benefits were

well-understood and would have led a POSITA to consider storing the compressed MPEG data based on the combined teachings of Hamadani and Dvir as explained above in section X.C.1.

5. *Claim 16*

Claim 16 is nearly identical to claim 12 of the '535 patent, but instead of the phrase “the selected one or more asymmetric compressors” used in claim 12, claim 16 states “the one or more selected asymmetric compressors.” This difference in claim language as between claims 12 and 16 is not substantive because it merely reorganizes the words in the phrase “the selected one or more” (claim 12) to read “the one or more selected.” Neither the '535 patent nor its claims suggest any difference is intended based on the swapping of the place where the word “selected” appears in the claim. Therefore, cross-reference is made to the analysis of claim 12, which shows that the subject matter of claim 16 would have been obvious to a POSITA. *Supra* § X.C.3.

6. *Claim 17*

Claim 17 requires “retrieving and transmitting at least a portion of the at least stored one or more portions of the one or more compressed data blocks based upon a user command.” This additional limitation would have been obvious too.

Hamadani explains that when a “user at one of the peripheral locations 208 sends a request for the multimedia data stored in the multimedia storage 206,” the

data is sent to the decoder over “TV cables or telephone lines” where to the peripheral locations where it is then decoded. Ex. 1013, 7:48-8:2, Fig. 6. The “request” made by the user is a user command because it is a command from a user requesting the compressed data be received by the decoder and decoded for display. Ex. 1002, ¶¶ 246-247. In Hamadani, the user request causes retrieval of the compressed video data from storage (206) and the transmission of that compressed data to the peripheral location. Ex. 1002, ¶ 247. Therefore, all aspects of the claimed method were known in the prior art.

A POSITA would have found claim 17 obvious in view of the combination of Dvir and Hamadani. Specifically, as discussed above, *supra* § X.C.1, a POSITA would have been motivated to implement Hamadani’s storage systems for Dvir’s compressed video. Ex. 1002, ¶ 249. Hamadani’s multimedia distribution systems allowed end users to make requests for data and to retrieve compressed video data on-demand. Ex. 1013, 7:48-8:2. Video on demand systems were known for distributing compressed video content to remote users and MPEG compression was commonly used in such systems as Hamadani shows. Ex. 1002, ¶ 249; Ex. 1013, FIGs. 2 & 3, 4:17-51.

A POSITA would have been motivated to combine Dvir and Hamadani in a way that would disclose the claimed subject matter because the claimed steps are nothing more than the combination of Dvir’s scheme for selecting an asymmetric

MPEG encoding scheme based on parameters determined from data and compressing using the selected MPEG compression method with a multimedia distribution system like that disclosed in Hamadani, where data is compressed using an MPEG compression technique, stored, and then retrieved and transmitted based on a user command seeking that data. Ex. 1013, 1:21-25, 7:62-8:1. A POSITA would have understood that the claimed subject matter was simply the combination of known processes used for their intended purposes, and would not have seen any unexpected results from combining the various steps. Ex. 1002, ¶ 249. The usefulness of MPEG compression of multimedia data, storage, retrieval, and transmission of such data is explicitly taught by Hamadani, Ex. 1013, 7:48-8:2, and would have been a compelling reason for a POSITA to practice the steps recited in claim 17—i.e., to allow a user to retrieve compressed data upon command. Ex. 1002, ¶ 249.

7. *Claim 19*

Claim 19 depends from claim 16, and requires a step of “retrieving and transmitting at least a portion of the at least stored one or more portions of the one or more compressed data blocks based upon a user value.” There is no description in the ’535 patent of what a “user value” is. However, since claim 17 has identical language with the exception that “user value” is replaced with “user command,” a “user value” presumably has a different scope than a “user command.”

Hamadani explains that “a user at one of the peripheral remote locations 208 sends a request for the multimedia data stored in the multimedia storage 206.” Ex. 1013, 7:62-66. This “user request” is sent over a network consisting of “cables or telephone lines,” and have been understood to include a “value” based on the user’s request. Ex. 1002, ¶ 252. Computer systems such as those described by Hamadani operate based on digital data which represents values of user input. *Id.* Hamadani discloses that the “peripheral locations 210” include PCs. Ex. 1013, 7:59-62. These PCs are designed to receive input from some input device and operate on the input data as values. These values, which represent the user’s input—such as a request to receive a video stored on multimedia storage 206, Ex. 1013, 7:62-66—are “user values” because they are values that represent the user’s input into the PC at Hamadani’s peripheral locations. Therefore, Hamadani teaches “retrieving and transmitting” the stored data “based upon a user value” reflected by the user’s request. The reasons that the additional steps of claim 19 would have been obvious to a POSITA are discussed above in connection with the analysis of the obviousness of claims 16 and 17, and the discussion above. *Supra* §§ X.C.5-X.C.6.

8. *Claim 22*

Claim 22 depends from claim 16, which in turn depends from claim 15. *See* Ex. 1001, cl.22, cl.16. Claim 22 recites that “the at least stored one or more portions of the one or more compressed data blocks comprises: audio or video information.”

Ex. 1001, cl.22. As explained above, both Dvir and Hamadani describe the compression of video data. *See, e.g.*, Ex. 1007, Abst., (“A . . . method for rapid video data compression”); Ex. 1013, 7:48-51 (describing a “video-on-demand” system); *see also supra* §§ X.C.1. The MPEG encoding schemes discussed by both Dvir and Hamadani are intended to be used to encode video data, and a POSITA would have found it obvious to arrive at the subject matter recited by claim 22 for the reasons discussed with respect to claims 15 and 16, above. *See supra* §§ X.C.4-X.C.5.

D. Ground 4: Claim 21 Is Obvious Over the Combined Teachings of Dvir (With or Without Koz), Hamadani, and Figueredo

Claim 21 would have been obvious in view of the combined teachings of Dvir (with or without Koz), Hamadani, and Figueredo.

1. Motivation to Combine

A POSITA would have been motivated to combine the teachings of Dvir (with or without Koz) with Hamadani and Figueredo to store the video created in Dvir and provide for remote transmission of that video, as disclosed in Hamadani, and to further provide for transmission of that video data based on throughput of a communications channel, as disclosed in Figueredo.

As explained in section X.C.1, both Hamadani and Dvir disclose systems where data is compressed. And, Hamadani discloses that the compressed data blocks are stored, and can later be retrieved and transmitted based on user request. Ex. 1013, 7:62-66 (“When a user at one or the peripheral locations 208 [sic 210] sends

a request . . . the CPU 208 . . . read[s] the requested data from the storage 206 [and] provides the MPEG decoder 212 with data type and data size information . . .”). A POSITA would be motivated to combine these references, as discussed above, to provide for storage and later retrieval of Dvir’s compressed video streams.

A POSITA would have understood from Hamadani that potential network congestion problems could occur, either when the channel was too congested to receive and decode data from the storage 206 in real time, or the possibility that users may connect to the network using a slower dial-up connection. Ex. 1002, ¶¶ 269-270, Ex. 1013, 7:58-59, 8:10-11. A POSITA therefore would have been motivated to find a solution to the problem of reduced data capacity when the throughput of the communications channel is low. Ex. 1002, ¶ 269-270.

A POSITA would have been aware of the teachings of Figueredo, which discloses another type of video-on-demand system. While Figueredo’s primary embodiment pertains to a video-on-demand system used in telemedicine, Figueredo’s teachings related to the video system are more broadly applicable, *id.*, Ex. 1020, 3:60-62, 7:45-47.

Figueredo teaches that a “recorded video device 104” may be coupled to “transmitter 103” so that video images received by the transmitter may be stored “for playback at a later time,” thus allowing the transmitter to distribute the video to the receivers at a later time. Ex. 1020, 4:6-14. The user may “record a specific

transmitted segment, [and] transmit that segment at a later time, and view the segment full frame and full motion.” Ex. 1020, 7:7-19. A user may elect to retrieve and transmit the stored video images at a later time based on network congestion, such that the end user can “later download the recorded video.” Ex. 1020, 7:28-38. Thus, a POSITA would have understood that instead of “live streaming” the video, Figueredo’s end user can cause the video to be stored, retrieved, and transmitted at a later time when the throughput of a communications channel is better. Ex. 1002, ¶ 271

Based on these teachings, a POSITA would have been motivated to include Figueredo’s system of deferring retrieval and transmission of the video data until a time when network conditions are more favorable in the combination of Dvir and Hamadani, to achieve the advantages described in Figueredo. A POSITA reading Figueredo would have recognized that when a certain picture quality could not be obtained due to channel conditions, the video stream could be retrieved and transmitted at a later time for viewing at the remote device. Ex. 1002, ¶ 272. This technique would have been useful in improving systems like those taught by Hamadani because this technique would have allowed a viewer to retrieve the video at a time when there was less network congestion and would have allowed the end-user to download and later view the video when convenient. *See* Ex. 1002, ¶ 272. For example, when using a telephone line connection and a slower modem to acquire

the video information, rather than occupying the telephone line while a video downloaded, the user with a low-throughput connection could download the video overnight when the telephone line would not have otherwise been used and when congestion would have otherwise been lower. Ex. 1002, ¶¶ 270-271.

Figueredo's disclosure of a method in which compressed video is retrieved and transmitted at a later time based on the throughput of a communications channel would have been seen as a practical way to improve Hamadani's techniques to accommodate for the fact that there will be occasions in which users will connect from Hamadani's peripheral locations and have poor network configurations. Ex. 1002, ¶ 272. Since this technique improved the operation of Figueredo's system, it would have been able to improve the operation of Hamadani's in the same way—by scheduling around communication channel throughput issues. Ex. 1002, ¶¶ 270-271.

2. *Claim 21*

- a. [21A]: “retrieving and transmitting at least a portion of the at least stored one or more portions of the one or more compressed data blocks”

The combination of Dvir and Hamadani discloses this feature of claim 21 because Hamadani explains that “[w]hen a user at one of the peripheral locations 208 [sic 210] sends a request for the multimedia data stored in the multimedia storage 206, the CPU 208 enables the MPEG decoder 212 associated with the user

to read the requested data from the storage 206 . . . the CPU 208 provides the MPEG decoder 212 with data type and data size information . . .” Ex. 1013, 7:62-8:2. This data is transmitted to and received at the decoder 212 at the remote location. *Id.*, 7:59-62 (explaining that the peripheral location includes the decoder), 8:4-6 (explaining that the decoder decodes the MPEG data for display). Hamadani, therefore, discloses retrieval of the MPEG-compressed data blocks from storage 206 and the transmission of that data across the transmission lines linking the peripheral locations to the central location. *See* Ex. 1013, Fig. 6, 7:51-62.

- b. [21B] “. . . based upon a throughput of a communication channel used for transmission of the at least retrieved portion of the at least stored one or more compressed data blocks.”

It would have been obvious to use a throughput of communication channel with the retrieval system disclosed in Hamadani because doing so would have allowed retrieval and transmission of compressed video in a way that addressed network congestion problems and slow connections. *Supra* § X.D.1.

Figueredo teaches that if a certain video quality cannot be obtained “in a given circumstance, e.g., over a 56K bit per second modem connection, the remote physician can still remotely direct the selection of the image (e.g., with a setting of one frame per second) and remotely start and stop the recorder, and then later download the recorded video.” Ex. 1020, 7:28-38. Figueredo thus teaches that when video of a certain quality cannot be “streamed” from the system due to network

issues, the video would be recorded thus allowing for later downloading of the video. Ex. 1002, ¶¶ 267. Figueredo thus discloses “retrieving and transmitting at least a portion” of the stored video “based upon a throughput of a communication channel used for transmission of the at least retrieved portion of the at least stored one or more portions of the one or more compressed data blocks.” *See* Ex. 1002, ¶ 268. This is because the retrieval and transmission of stored compressed data at a later time as taught by Figueredo is “based upon” network congestion, restricted bandwidth or download speeds, etc. and is thus based on throughput of the communications channel used to transmit the compressed data. *Id.*

Therefore, for the reasons explained above, based on the combined teachings of Dvir (with or without Koz), Hamadani, and Figueredo, the subject matter of claim 21 would have been obvious.

E. Ground 5: Claims 1, 8, 15, and 24 Are Obvious Over Ishii And Koz

1. Motivation to Combine

A POSITA would have been motivated to combine the teachings of Ishii and Koz to implement MPEG video compression, as disclosed in Koz, within the system of Ishii.

Ishii describes a “file compression processor” that is used to store data including image data to a storage medium. *See* Ex. 1021, 1:11-15. Ishii explains “on-line information services” must store image data in storage so that a user may

access the data remotely. Ex. 1021, 1:17-23. Before Ishii, systems would compress all files in storage, even when there was available space; which required decompression before any files could be read. *Id.*, 1:32-38. Ishii's improvement was a system that (1) prevented compression when there was adequate storage space available, and (2) when compressing, "selects the suitable compression method corresponding to the access frequency and type of the file." Ex. 1021, 1:49-55.

Ishii teaches that once the "current available file capacity is below [a] threshold," the system searches for files to compress. Ex. 1021, 5:43-50. The appropriate data compression method for the file is selected "considering the data attribute (whether it is text data or binary data such as programs and image data) and access frequency." *Id.*, 6:1-6. "The access frequency of a file is determined based on": (1) "the last access date" and (2) "the number of accesses for that file," and classified as high, medium, or low. *Id.*, 5:54-56. "The data attribute of a file is checked in the selection of the data compression method so as to select a suitable data compression method with a higher compression ratio. The access frequency of a file is used for selecting a data compression method with a shorter data compression/decompression time." *Id.*, 6:7-12; *see also id.*, 7:22-34.

A POSITA seeing Ishii and aware of the developments of network-based content would have understood that data types had proliferated beyond mere images to content such as videos available over networks. Ex. 1002, ¶ 282. Therefore, in

addition to looking for image and text compression algorithms, a POSITA would have expanded Ishii's concepts to compress additional types of data that were becoming available to Internet users, such as video. *Id.* A POSITA would have understood that video and image compression techniques were, in many ways, similar and that both videos and images would both benefit from data compression to reduce the amount of storage space occupied. *Id.*, ¶¶ 282-83.

For example, before the '535 patent's priority date, a POSITA would have been aware of Koz, which describes interrelationships between standardized image compression techniques and standardized video compression techniques. Koz explains that MPEG had standardized compression for video which was "[l]ike the JPEG still image compression standard" and shared "similar approaches to" a number of aspects of the algorithm. Ex. 1022, 1:66-2:9. Moreover, from Koz's teachings, a POSITA would have realized that the use of digital video was becoming popular and that "great attention has been directed to data compression" related to video data. Ex. 1022, 1:33-36; Ex. 1002, ¶ 283. Additionally, Koz explains that the standardized MPEG compression technique "is asymmetric" because "compression requires more effort than decompression." Ex. 1022, 2:9-11.

A POSITA would have looked to the combined teachings of Ishii and Koz because of the proliferation of video data on the Internet, and because video data and image data were known to be used in computer systems and both were known to be

compressed using “similar approaches.” Ex. 1022, 1:66-2:9. A POSITA would have seen an advantage in implementing the teachings of Ishii in a system that stores a variety of data types beyond simply “text data” or “binary data such as programs and image data.” Ex. 1021, 6:3-4; Ex. 1002, ¶¶ 282-283. For example, a POSITA would have recognized that computer systems would need to store video based on the combined teachings of Koz and Ishii to keep apace of the proliferation of data types on the Internet. *Id.* Therefore, to handle video data, a POSITA would have recognized that it would have been advantageous to use the techniques disclosed in Ishii to more optimally use storage space by compressing video files using techniques tailored to the file type and based on access frequency, with the asymmetric MPEG compression taught by Koz for compressing video data. *See, e.g.,* Ex. 1002, ¶ 283; Ex. 1021, 5:66-6:17. MPEG compression techniques were well known to result in substantial reduction of overall size of a video file, making it a compelling choice for use in the compression of video data. Ex. 1002, ¶ 297.

Therefore, a POSITA would have been motivated to practice the method steps of claim 1 and would have recognized the benefits of using Ishii’s techniques for identifying a file to be compressed, identifying such a file as a video file, identifying the access frequency, and selecting an asymmetric MPEG encoding technique based on Koz’s teachings that the MPEG video compression technique is used to compress video data and is similar to standardized image compression techniques. Expanding

Ishii's teachings to video data in addition to image data would not have required anything more than routine skill and would have required the use of known elements (e.g., video data and video compression techniques) for their known purposes (use of video data and compression of video data) and would not have presented any unexpected results. Ex. 1002, ¶ 283.

2. *Claim 1*

a. [1P]: "A method comprising:

Ishii discloses a method. *E.g.*, Ex. 1021, 2:22-26, 6:49-8:10, Figs. 2 & 5.

b. [1A]: "determining a parameter or attribute of at least a portion of a data block having audio or video data;"

Ishii discloses "determining a parameter or attribute of at least a portion of a data block." Ex. 1001, cl.1. Ishii explains that for a specific data block—e.g., a file—an "access frequency" is determined based on the "last access date" and "the number of accesses for that file." Ex. 1021, 5:51-59. The "last access date" and "the number of accesses for that file" are parameters or attributes of that file because these characteristics connote recency and frequency of use of the file. Ex. 1002, ¶ 289.

As explained above in section X.E.1, a POSITA would have been motivated to implement Ishii's teachings on video data using MPEG compression techniques as disclosed in Koz. *See* Ex. 1022, 2:2-3 (referring to "JPEG still image compression standard"); Ex. 1002, ¶ 291. Moreover, from teaching such as those set forth in Koz

a POSITA would have realized that the use of digital video in computer applications was becoming popular and computers needed to be able to process and store video content and that “great attention has been directed to data compression” related to video data. Ex. 1022, 1:33-36; Ex. 1002, ¶¶ 290-291.

It would have been obvious to include among Ishii’s files for compression video data, for the reasons explained in detail above.

- c. [1B]: “selecting an access profile from among a plurality of access profiles based upon the determined parameter or attribute;”

Ishii also discloses “selecting an access profile from among a plurality of access profiles based upon the determined parameter or attribute.” Ex. 1001, cl.1. According to Ishii using the determined parameters or attributes—i.e., last access date and number of accesses—the “access frequency” is determined. Ex. 1021, 5:54-56. This “access frequency” is then selected as being either “high, medium, [or] low.” *Id.* The characterization of a file as a high, medium, or low access would have been understood to be an access profile because the “access frequency” has information that is used in data compression and is associated with one or more characteristics of the data such as the number and recency of accesses of that data. Ex. 1002, ¶ 293; *e.g.*, Abst., Ex. 1021, 5:60-6:17 (describing use of “access frequency” in selecting compression to be applied).

- d. [1[C][i]]: “compressing the at least the portion of the data block with one or more compressors using asymmetric data compression and information from the selected access profile,” [1[C][ii]]: “the information being indicative of one or more compressors to apply to the at least the portion of the data block.”

Ishii discloses “compressing the at least the portion of the data block with one or more compressors using . . . information from the selected access profile.” Specifically, Ishii discloses that “[t]he data compression method selection portion 104 selects, from some data compression methods selected according to the data attribute, the one with shorter data compression/decompression time for a file with higher access frequency and the one with a higher compression ratio for a file with lower access frequency.” Ex. 1021, 6:12-17. This discloses using information from the selected access profile—i.e., the higher or lower designation reflecting the access frequency in the compression of the data by selecting the appropriate compression technique. Ex. 1002, ¶ 295. Additionally, Ishii uses the access frequency to indicate which compressor to apply to the file in that it describes selecting compressors with shorter or longer time based on higher or lower access frequencies associated with the file. *Id.*, ¶ 296.

Ishii does not expressly describe the use of “asymmetric data compression.” However, the use of asymmetric data compression to compress files such as video files was well known to the POSITA as shown by, for example, Koz. *See* Ex. 1022,

2:9-11 (“As with most interframe compression schemes, MPEG is asymmetric—compression requires more effort than decompression.”).

3. *Claim 8*

Ishii further discloses a step of “selecting the one or more compressors to compress the at least the portion of the data block to create at least a second compressed data block based upon a number of reads of at least a portion of a first compressed data block that was created from the at least the portion of the data block..”

Specifically, a POSITA would have understood Ishii to disclose the following process for compressing and decompressing data:

- *First*, determining that a file unit capacity is below a threshold, Ex. 1021, Fig. 2, 5:43-50, 6:63-7:5;
- *Second*, identifying a file for compression and selecting the compression routine based on the access frequency and data attribute (file type), *id.*, 5:60-6:17, 7:15-8:10;
- *Third*, when a compressed file is to be used by a program, decompressing the compressed file, *id.*, 8:11-21;
- *Fourth*, updating information related to the “last access date” and “number of accesses for that file,” *id.*, 5:54-56; and

- *Fifth*, determining that a file unit capacity is again below a threshold, *id.*, Fig. 2, 5:43-50, 6:63-7:5; and
- *Sixth*, compressing the file based on the number of reads of that data block that was decompressed in the third step, *id.*, 5:60-6:17, 7:15-8:10.

This process discloses the subject matter of claim 8. Ex. 1002, ¶¶ 300-302. Specifically, as file storage space is needed, files are compressed. *Id.*; Ex. 1021, Fig. 2, 5:43-50, 5:60-6:17, 6:63-7:5. As those files are needed, they are decompressed, causing the amount of storage space used in the file unit to increase and once again approach the threshold. Ex. 1002, ¶¶ 300-302; Ex. 1021, 8:11-21. When the threshold is exceeded, files are again evaluated and considered for compression and storage, and this occurs based on the number of reads of the data. Ex. 1002, ¶ 300-302; Ex. 1021, 5:54-56. For unpopular files (files not accessed for a long time), Ishii thus discloses that the probability of compression would increase. Therefore, Ishii discloses claim 8.

4. Claim 15

- a. [15P]: “A method, comprising:”

Supra feature [1P].

- b. [15A]: “determining a parameter of at least a portion of a data block;”

Supra feature [1A]. The parameter taught by Ishii includes “the last access date,” or the “data attribute” (data type). Ex. 1021, 5:50-6:17; Ex. 1002, ¶ 288.

- c. [15B]: “selecting one or more asymmetric compressors from among a plurality of compressors based upon the determined parameter or attribute;”

Ishii discloses “selecting one or more . . . compressors from among a plurality of compressors based upon the determined parameter or attribute.” Ex. 1001, cl.15. Specifically, Ishii discloses that “file compression portion” compresses the file “[a]ccording to the attributes of the file to be compressed including access frequency and file type” Ex. 1021, 5:62-65; *see also id.*, 6:1-6 (“It selects the data compression method suitable for the file considering the data attribute . . . and access frequency”), 6:7-17. Ishii does not expressly disclose that the compressor is an “asymmetric compressor,” but such compressors were well known in the context of video encoding, and would have been obvious to employ in connection with Ishii’s techniques to handle the compression and decompression of video data as explained in connection with the analysis of claim 1, above. *See supra* § X.E.2.

- d. [15[C]]: “compressing the at least the portion of the data block with the selected one or more asymmetric compressors to provide one or more compressed data blocks; and”

Ishii discloses “compressing the at least the portion of the data block with the selected one or more . . . compressors to provide one or more compressed data blocks.” Ex. 1001, cl.15; *supra* § X.E.2.d. As discussed above, it would have been obvious to use asymmetric compression in connection with Ishii’s techniques, *see supra* § X.E.2.d.

- e. [15[D]]: “storing at least a portion of the one or more compressed data blocks.”

Ishii discloses “storing at least a portion of the one or more compressed data blocks.” Ex. 1001, cl.15. Ishii explains that “file compression portion 105 actually compresses data of the searched file to be compressed, so as *to record it on the disk 131 in the file unit 130.*” Ex. 1021, 5:60-62. Ishii is concerned with trying to ensure that data in the “file unit” does not exceed a certain capacity, and if it does, to identify and compress certain files until the amount of data in the file unit drops below the threshold. Ex. 1021, Fig. 2, 6:49-8:10. Thus, Ishii stores data as a compressed file. Ex. 1002, ¶ 311. Ishii therefore discloses “storing at least a portion of the one or more compressed data blocks.” Ex. 1001, cl.15; Ex. 1002, ¶ 312.

5. *Claim 24 Would Have Been Obvious Over Ishii and Koz*

Ishii further discloses a step of “selecting the one or more . . . compressors based upon the determined parameter or attribute and a number of reads of the at least the portion of the data block.” Ex. 1001, cl.24. Specifically, Ishii explains that the compressor to be used on a data block is based upon the determined parameter (e.g., file type/file attribute or last access data) and a “number of reads”—i.e., the “number of accesses” for that data block. *See, e.g.*, Ex. 1021, 5:50-6:17 (explaining that compression methods are selected based on “access frequency and file type,” and indicating that “access frequency” is determined based on “last access date and the number of accesses” and is classified as “high, medium, and low”). Ishii

therefore discloses the “selecting” step recited by claim 24 of the ’535 patent. Ex. 1002, ¶ 313. And, for the reasons discussed above, the combined teachings of Ishii and Koz renders obvious the use of asymmetric data compressors for compressing video data. *See supra* § X.E.1.

XI. FEES

The required fee is being paid electronically through PTAB E2E.

XII. CONCLUSION

For the foregoing reasons, Petitioner respectfully requests the Board institute trial on claims 1-6, 8-12, 14-17, 19, 21, 22, 24 of the ’535 patent and cancel those claims as unpatentable.

Dated: July 12, 2018

Respectfully submitted,

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CERTIFICATE OF COMPLIANCE

This petition complies with the word count limits set forth in 37 C.F.R. § 42.24(a)(i), effective May 2, 2016, because this Petition contains 13,553, excluding the parts of the petition exempted by 37 C.F.R. § 42.24(a), as corrected in *Amendments to the Rules of Practice for Trials Before the Patent Trial and Appeal Board*, 81 Fed. Reg. 24,702 (Apr. 27, 2016) and determined using the word count provided by Microsoft Word, which was used to prepare this Petition.

Dated: July 12, 2018

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CERTIFICATE OF SERVICE

Pursuant to 37 C.F.R. §§ 42.6(e) and 42.105(a), this is to certify that on July 12, 2018, I caused to be served a true and correct copy of the foregoing PETITION FOR *INTER PARTES* REVIEW and Exhibits 1001-1026 by EXPRESS MAIL on Patent Owner the correspondence address of record for U.S. Patent No. 8,934,535, as follows:

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