IN THE UNITED STATES DISTRICT COURT
FOR THE EASTERN DISTRICT OF TEXAS
MARSHALL DIVISION

VALTRUS INNOVATIONS LIMITED, KEY PATENT INNOVATIONS LIMITED, Plaintiffs, v. DATABANK HOLDINGS, LTD., Defendant.	Civil Action No. 2:24-cv-00777 JRG (Lead Case) **JURY TRIAL DEMANDED**
VALTRUS INNOVATIONS LIMITED, KEY PATENT INNOVATIONS LTD., Plaintiffs, v. TIERPOINT, LLC, Defendant.	Civil Action No. 2:24-cv-00776-JRG (Member Case) **JURY TRIAL DEMANDED**

DEFENDANTS' INVALIDITY AND INELIGIBILITY CONTENTIONS AND DISCLOSURES PURSUANT TO PATENT RULE 3-3

EXHIBITS

Exhibit	Invalidity Claim Charts
A-1 – A-16	Invalidity claim charts for U.S. Patent No. 6,718,277
B-1 – B-22	Invalidity claim charts for U.S. Patent No. 6,854,287
C-1 – C-27	Invalidity claim charts for U.S. Patent No. 6,862,179
D-1 – D-8	Invalidity claim charts for U.S. Patent No. 7,031,870
E-1 – E-10	Invalidity claim charts for U.S. Patent No. 6,854,284
F-1 – F-19	Invalidity claim charts for U.S. Patent No. 6,868,683
G-1 – G-34	Invalidity claim charts for U.S. Patent No. 6,868,682

VALTRUS EXHIBIT 2022
VERTIV v. VALTRUS IPR2025-00667
2 of 214

INTRODUCTION

Defendants DataBank Holdings, Ltd. and TierPoint, LLC ("Defendants") hereby submit their Invalidity Contentions concerning patent claims asserted by Plaintiffs Valtrus Innovations Limited and Key Patent Innovations Limited ("Plaintiffs"). The citation of prior art herein and the accompanying exhibits are being disclosed as, and should be construed as nothing more than, Defendants' Invalidity Contentions, and may, in part, be based on Plaintiffs' apparent view as to the scope of the Asserted Claims as reflected in its Infringement Contentions. Defendants in no way accept Plaintiffs' apparent reading of the claims as reflecting the proper scope of the claims.

Defendants' Invalidity Contentions are based on their current knowledge, understanding of the prior art and information reasonably available. Thus, Defendants expressly reserve the right to amend, or supplement these Invalidity Contentions based on further investigation, discovery, evaluation of the scope and content of the prior art, admissions, the Court's claim construction, any other reasonable basis, and as permitted by the Court, Local Rules and the Federal Rules of Civil Procedure.

Further, the Court has not yet construed the Asserted Claims. Plaintiffs' subsequent assertions, and the Court's construction may alter the materiality and relevance of some references and moot the Invalidity Contentions while simultaneously giving rise to new issues regarding invalidity of the Asserted Patents.

These Invalidity Contentions are based in large part on what Defendants believe are Plaintiffs' claim constructions. They shall not be treated as an admission that Defendants agree with Plaintiffs' claim constructions, or that Plaintiffs' contentions on the meaning of the claims are correct. To the extent Defendants determine that a different meaning is appropriate for any claim term, they will assert that in connection with Court's procedures, and reserve the right to

VALTRUS EXHIBIT 2022
VERTIV v. VALTRUS IPR2025-00667
3 of 214

update these Invalidity Contentions as a result of the *Markman* hearing, or any other subsequent clarification or alteration of the meaning of claim terms.

Much of the prior art identified in the attached exhibits reflect common knowledge and the state of the art before the filing date of the Asserted Patents. In many instances where a particular contention calls for combining references, any one of a number of references can be combined. The inclusion of certain exemplary combinations of prior art references does not exclude other combinations based upon the claim charts attached hereto.

I. ASSERTED PATENTS

Plaintiffs' Infringement Contentions assert the following patents and patent claims (collectively, the "Asserted Patents" and "Asserted Claims"):

Asserted Patent	Asserted Claims
6,718,277 (the "'277 patent")	1-11, 12-21
6,854,287 (the "'287 patent")	1-9
6,862,179 (the "'179 patent")	1-6, 9-13, 15
7,031,870 (the "'870 patent")	1-2, 6-12
6,854,284 (the "'284 patent")	10-13, 16-17
6,868,683 (the "'683 patent")	10-13, 15
6,868,682 (the "'682 patent")	1-4, 7-10

II. RESERVATION OF RIGHTS

Defendants' Invalidity Contentions are based on their current knowledge of the Asserted Patents, the prior art, Plaintiffs' Infringement Contentions, and upon information presently and reasonably available to Defendants. This litigation is in the early stages, and Defendants' investigation of the prior art is ongoing. Consistent with the local Patent Rules (including P.R. 3-6) and the Federal Rules of Civil Procedure, Defendants reserve the right to supplement, amend,

VALTRUS EXHIBIT 2022
VERTIV v. VALTRUS IPR2025-00667
4 of 214

modify, revise, or correct any aspect of their Invalidity Contentions and to provide additional information as such information becomes available through discovery or otherwise.

No aspect of Defendants' Invalidity Contentions shall be deemed to be an admission that their contentions are complete. In particular, Defendants reserve the right to supplement their Invalidity Contentions as discovery continues and after any further claim construction by the Court. In addition, Defendants also reserve the right to supplement their Invalidity Contentions should Plaintiffs subsequently attempt to amend their P.R. 3-1 or 3-2 disclosures in any way, or to otherwise modify their infringement allegations against Defendants or seek to establish an earlier date of invention (while reserving all rights to challenge any attempt by Plaintiffs to do so).

Defendants further reserve the right to supplement their Invalidity Contentions with information subsequently provided by Plaintiffs concerning their infringement contentions. Plaintiffs' Infringement Contentions fail to identify specifically for many of the asserted claim limitations the allegedly infringing structures and acts in the accused products and methods, in contravention of P.R. 3-1. Plaintiffs' failure to identify specifically infringing structures and acts prevents Defendants from searching for, locating, presenting, and relying on prior art having all or some of such structures and acts, thus effectively denying Defendants the opportunity to rely on the fundamental principle that whatever infringes a claim if later in time anticipates the claim if earlier in time, and further denying Defendants the opportunity to conduct other invalidity analytical methods.

Moreover, Defendants reserve the right to revise their ultimate contentions concerning the invalidity of the claims of the Asserted Patents based upon the Court's construction of the claims of the Asserted Patents, any findings as to the priority dates of the Asserted Claims, and/or positions that Plaintiffs, Defendants, or any expert witness may take concerning claim

VALTRUS EXHIBIT 2022
VERTIV v. VALTRUS IPR2025-00667
5 of 214

interpretation, infringement, and/or invalidity issues. Prior art not included in this disclosure, whether known or not known to Defendants, may become relevant.

In particular, Defendants are currently unaware of the extent, if any, to which Plaintiffs will contend that limitations of the Asserted Claims are not disclosed in the prior art identified by Defendants. To the extent Plaintiffs contend limitations of the Asserted Claims are not disclosed in the prior art identified by Defendants, Defendants reserve the right to identify other references that would have made the addition of the allegedly missing limitation to the disclosed device or method obvious or show that the allegedly missing limitation would have been known or readily apparent to one of ordinary skill in the art at the time of the alleged invention in light of the disclosure of the prior art at issue. Defendants reserve the right to rely on any reference found in the prosecution histories of the applications leading to the Asserted Patents or otherwise identified in connection with this litigation.

Further, Defendants reserve the right to rely on any reference or item sought or to be sought from third parties that is solely within those third parties' possession, custody, or control, and has not yet been produced during discovery. Defendants may issue subpoenas to third parties believed to have knowledge, documentation and/or corroborating evidence concerning some of the prior art listed herein and/or additional prior art. These third parties include, but are not limited to, the authors, employers of authors, inventors, assignees, or former or current employee of assignees, of the references identified or the Asserted Patents, and of other parties accused of infringing the Asserted Patents in this or related litigation matters.

Defendants reserve the right to supplement these Invalidity Contentions in light of any newly discovered information produced by these or other companies from which Defendants may seek discovery. Much of the art identified in the attached exhibits reflects common knowledge and

VALTRUS EXHIBIT 2022
VERTIV v. VALTRUS IPR2025-00667
6 of 214

the state of the art before the filing date of the Asserted Patents. In many instances where a particular contention calls for combining references, any one of a number of references can be combined. The inclusion of certain exemplary combinations of prior art references does not exclude other combinations based upon the claim charts attached hereto. Each of the Asserted Claims of the Asserted Patents is anticipated by and/or obvious in view of one or more of the items of prior art identified herein alone or in combination with other prior art references.

Defendants' claim charts cite to or reference particular teachings and disclosures of the prior art as applied to features of the Asserted Claims, but persons having ordinary skill in the art generally may view an item of prior art in the context of other publications, literature, products, and understanding. As such, the cited portions are examples only, and Defendants reserve the right to rely on uncited portions of the prior-art references and on other publications and expert testimony as aids in understanding and interpreting the cited portions, as providing context thereto, and as additional evidence that the prior art discloses a claim limitation.

Defendants further reserve the right to rely on uncited portions of the prior-art references, other publications, and testimony to establish reasons for combining certain cited references that render the Asserted Claims obvious. The references discussed in the claim charts may disclose the elements of the Asserted Claims explicitly and/or inherently, and/or they may be relied upon to show the state of the art in the relevant time frame. Defendants intend to rely on admissions concerning the scope of the prior art relevant to the Asserted Patents found in, inter alia: the Asserted Patents and related patents and/or patent applications; the patent prosecution histories for the Asserted Patents and related patents and/or patent applications (including all prior art cited therein); any deposition testimony of the named inventors of the Asserted Patents and related patents and/or patent applications in this matter or any other matter; evidence and testimony

VALTRUS EXHIBIT 2022
VERTIV v. VALTRUS IPR2025-00667
7 of 214

relating to the level of ordinary skill in the art; evidence from prior litigation, administrative proceedings, and correspondence involving the Asserted Patents and related patents; and the papers filed and any evidence submitted by Plaintiffs in connection with this matter or the related matters involving the Asserted Patents.

To the extent these Invalidity Contentions rely on or otherwise embody particular constructions of terms or phrases in the Asserted Claims, Defendants are not proposing or adopting any such constructions as proper constructions of those terms or phrases at this time. The Court has established, or will establish separate deadlines for the parties' proposed claim constructions in a Docket Control Order, and Defendants will disclose their proposed constructions according to those deadlines. For purposes of these Invalidity Contentions, Defendants may adopt alternative claim construction positions and broadly interpret each term or phrase. Certain of these contentions may be based on claim constructions that appear to underlie Plaintiffs' Infringement Contentions or claim construction positions. Defendants, however, do not concede that Plaintiffs' apparent constructions are proper, and expressly reserve the right to contest any such constructions. In addition, to the extent that these Invalidity Contentions suggest or imply a particular order in which the steps of method claims are performed, Defendants do not necessarily propose that the method claims must be limited to such order, although Defendants reserve the right to propose such an order.

Moreover, Defendants do not admit that any accused product, method, or service infringes any of the Asserted Claims. Nothing stated herein shall be treated as an admission, acknowledgement, acquiescence, or suggestion regarding the scope of any of the Asserted Claims or that any accused technology meets any limitations of the claims. Nothing stated herein shall be construed as an admission or a waiver of any particular construction of any claim term. Moreover,

VALTRUS EXHIBIT 2022
VERTIV v. VALTRUS IPR2025-00667
8 of 214

use of terms herein from the Asserted Patents should not be understood to mean that such terms as used in the Asserted Patents, or claims, thereof are definite, enabled, or supported by adequate written description in accordance with 35 U.S.C. §§ 112(1), (2), (6).

Likewise, use of terms herein from the Asserted Patents should not be understood to suggest or imply a common, usual, ordinary, customary, plain, or accepted meaning in the art for any such term. Defendants' Invalidity Contentions are made in a variety of alternatives and do not represent Defendants' agreement or view as to the meaning, definiteness, written description support for, or enablement of any claim contained therein. Given that the Court has not yet made any claim construction ruling in this action, Defendants' Invalidity Contentions are made in a variety of alternatives and are not intended to necessarily be consistent with each other and/or Defendants' other contentions in this action, and should not be otherwise construed. Defendants' contentions herein are not, and should in no way be seen as, admissions or adoptions as to any particular claim scope or construction, or as any admission that any particular claim element is met in any particular way. Defendants object to any attempt to imply claim constructions from any identification of potential prior art.

Additionally, Defendants' Invalidity Contentions may use Plaintiffs' improper assertions of infringement and improper applications of the claims to understand Plaintiffs' view of the scope of the Asserted Claims. Defendants do not agree with Plaintiffs' application of the claims and deny infringement. Further, to the extent an accused product or feature comprises or arises from prior art, Defendants contend, without admitting purported infringement, that the Asserted Patents are anticipated and/or made obvious in light of that prior art and Plaintiffs' own Infringement Contentions.

VALTRUS EXHIBIT 2022
VERTIV v. VALTRUS IPR2025-00667
9 of 214

In those instances where Defendants assert that the claims are invalid under 35 U.S.C. § 112 (e.g., no written description, not enabled, and/or indefinite), Defendants have applied the prior art in part in accordance with Defendants' assumptions that Plaintiffs: (1) contend those claims are definite, (2) find written description support for those claims, and (3) contend that those claims are enabled. However, Defendants' prior art invalidity contentions do not necessarily represent Defendants' agreement or view as to the meaning, definiteness, written description support for, or enablement of any claim contained therein. In fact, Defendants note numerous grounds for invalidity on such bases below.

Pursuant to P.R. 3-3(c), Defendants have, in the attached appendices, identified examples of where the subject matter recited in the preambles of the Asserted Claims may be found in various prior art references, without regard to whether the preambles are properly considered to be limitations of the Asserted Claims. Defendants reserve the right to argue that any of the preambles are or are not limiting during the claim construction proceedings in this case.

Defendants' Invalidity Contentions are based at least in part on the claimed priority dates that appear on the faces of the Asserted Patents and may also address any claims by Plaintiffs to have sworn behind such dates. Defendants reserve the right to challenge Plaintiffs' claimed priority dates for the Asserted Patents, based on the faces of the Asserted Patents or sworn behind or otherwise, as discovery continues and after any further claim construction by the Court, including based on Plaintiffs' proposed (or implicit) claim construction positions or other facts learned during discovery.

Discovery is ongoing, and Defendants reserve the right to assert invalidity under 35 U.S.C. §§ 101 and 102(a)-(g) to the extent that discovery or further investigation yield additional information forming the basis for such claims. Defendants reserve the right to assert that any

VALTRUS EXHIBIT 2022
VERTIV v. VALTRUS IPR2025-00667
10 of 214

Asserted Patent is invalid under 35 U.S.C. §§ 102(f) and 116, in the event Defendants obtain evidence that one or more of the named inventors should not have been named as an inventor, or that one or more persons who should have been named as an inventor was not named. In either event, Defendants will supplement their Invalidity Contentions to address the misjoinder and/or non-joinder of inventors by, inter alia, identifying the persons who should not have been named inventors (or who should have been named) and describing the relevant facts and circumstances. Pursuant to P.R. 3-3 and 3-4, Defendants have provided disclosures and related documents pertaining only to the Asserted Claims as identified by Plaintiffs in their Infringement Contentions. Defendants reserve the right to modify, amend, or supplement these Invalidity Contentions to show the invalidity of any additional claims that the Court may allow Plaintiffs to later assert. Defendants further reserve the right to supplement their P.R. 3-4 document production should it later find additional, responsive documents.

Defendants incorporate(s) by reference all other bases for invalidity that may be identified in other filings, including in any interrogatory responses or in submissions before the patent office (e.g., during *Inter Partes* Review proceedings) concerning the Asserted Patents and all related patents and/or parent applications, including but not limited to statements made by Defendants, the Patent Owner, APJs, and references cited therein.

Defendants further incorporate by reference any and all invalidity contentions previously served or subsequently served in the above captioned matters, including those served by other parties Plaintiffs have accused of infringement.

III. PRIORITY AND CONCEPTION DATES FOR THE ASSERTED CLAIMS

Plaintiffs have alleged that the Asserted Claims are entitled to the priority dates shown below:

VALTRUS EXHIBIT 2022
VERTIV v. VALTRUS IPR2025-00667
11 of 214

Asserted Patent	Asserted Claims	Priority Date
6,718,277	1-11, 12-21	April 17, 2002 (filing date of U.S. App. 10/123,403)
6,854,287	1-9	August 2, 2002 (filing date of U.S. App. 10/210,040)
6,862,179	1-6, 9-13, 15	Nov. 26, 2002 (filing date of U.S. App. 10/303,761)
7,031,870	1-2, 6-12	May 28, 2004 (filing date of U.S. App. 10/855,400)
6,854,284	10-13, 16-17	October 3, 2002 (filing date of U.S. App. 10/262,879)
6,868,683	10-13, 15	October 3, 2002 (filing date of U.S. App. 10/262,879)
6,868,682	1-4, 7-10	January 16, 2003 (filing date of U.S. App. 10/345,723)

Defendants understand Plaintiffs are not asserting an invention date, conception, reduction to practice, design, and/or development of the claimed invention, prior to the asserted priority dates identified above. To the extent Plaintiffs later allege that any such activities occurred prior to the priority dates identified above, Defendants reserve the right to object to such belated changes in position and/or to supplement these Invalidity Contentions to address any such contention, including by identifying and/or charting additional prior art that may become relevant in view of such assertion. To the extent Plaintiffs allege that any prior art relied on in these Invalidity Contentions do not actually qualify as prior art to the Asserted Patents, Defendants reserve the right to rebut those allegations (e.g., by demonstrating an earlier critical date for the challenged prior art and/or a later priority date and/or date of invention for a particular Asserted Claim). Defendants also reserve the right to rely on additional documents, information, and evidence to demonstrate public availability or public availability by a certain date of a prior art reference or to rebut any efforts by Plaintiffs to allege any reference was not publicly available or publicly available by a certain date or otherwise available as prior art.

IV. STATE OF THE ART

This section describes the general state of the art surrounding the claimed inventions at the time of the alleged invention and identifies a number of prior art references providing additional background, detail, and context, on which Defendants may rely. Defendants set forth additional

VALTRUS EXHIBIT 2022
VERTIV v. VALTRUS IPR2025-00667
12 of 214

description and summary of the state of the art for each of the Asserted Patents in the Sections regarding the Disclosures of the Asserted Patents below. Defendants also intend to rely on each of the prior art references discussed below and in exhibits to these Invalidity Contentions for purposes of demonstrating the state of the art for the Asserted Patents. Defendants also reserve the right to rely on the discussions of the state of the art and prior art in each of the Asserted Patents and their file histories including explanations of the state of the art and the correspondence of prior art references with the claims of the Asserted Patents. Defendants further expressly reserve the right to supplement their summary of the state of the art, including for example, by information from any of the authors or named inventors on any of the prior art references, by personnel familiar with systems based on any of the prior art, or by technical experts retained on behalf of any party.

The Asserted Patents generally relate to systems and methods for delivering cooling to controlled building environments, such as data centers. As indicated in Section III above, the priority dates for the Asserted Patents range from April 2002 – May 2004. By this timeframe, industry had, for decades, been acutely aware of the need to reliably deliver sufficient cooling to building environments, and specifically to data center racks in multiple zones. *See* claim charts A-1 *et seq.*, B-1 *et seq.*, C-1 *et seq.*, D-1 *et seq.*, E-1 *et seq.,* F-1 *et seq.,* and G-1 *et seq.* For starters, HVAC equipment, such as air conditioning units, refrigerant and chilled water cooling coils, air handlers, heat pumps and heat exchangers, had been in use for decades. Further, electronic thermostats, (inclusive of temperature sensors, controllers and firmware), were well-known and widely used to maintain a desired temperature range in cooling zones found in data centers and other residential, commercial, and/or industrial settings. It was also widely known that different zones required different cooling needs based on the variability of the equipment and other factors.

VALTRUS EXHIBIT 2022
VERTIV v. VALTRUS IPR2025-00667
13 of 214

Relatedly, the industry widely understood the need to promote efficiency by delivering sufficient cooling fluid to individual zones while avoiding delivering more than what was needed.

Indeed, as early as 1983, Vertiv's predecessor, Liebert Corporation, offered a series of Deluxe System/3 Cooling Water Systems, which became a widely known environmental control system for data centers used throughout the industry. These systems included many relevant features and functionalities (such as those identified in Charts B-19, B-20, C-25, C-26, F-17, and G-34) and became widely known and commercially implemented over the 20 years that followed prior to the priority dates of the Asserted Patents. For example, at least as early as 1985, Liebert's Deluxe System/3 Cooling Water systems varied the flow of cooling fluid to the air-to-fluid heat exchangers to address different cooling needs, such as in response to room temperature and humidity readings in a zone of a data center. *See* LIEBERT, DELUXE SYSTEM/3 TECHNICAL DATA MANUAL, SL-18100 (R 4/85) (1985) at 7. Additionally, Liebert's Deluxe System/3 Cooling Water systems were designed to promote energy efficiency when controlling the temperature in spaces such as data centers. *See, e.g.*, LIEBERT, DELUXE SYSTEM/3 CHILLED WATER SYSTEMS TECHNICAL DATA MANUAL, SL-18110 (R10/01) at 21 ("A variable speed drive (VSD) is available for models FH/UH600C, FH/UH599C, FH/UH740C, and FH/UH739C to reduce energy consumption. The fan motor speed shall be varied from 100% to 60% of rated speed in response to room conditions.").

In the same timeframe, Liebert offered a compressed refrigerant version of the Deluxe System/3. The "DX" model included a Dual Source Cooling capability that provided all the features of a compressed refrigerant system and a second cooling coil connected to a source of chilled water and individually controlled chilled water flow rate to each heat exchanger based on sensed temperatures to reduce compressor operation. *See, e.g.*, LIEBERT, DELUXE SYSTEM/3

VALTRUS EXHIBIT 2022
VERTIV v. VALTRUS IPR2025-00667
14 of 214

OPERATIONS MANUAL 2000 at 3-4. Liebert also disclosed this design in multiple patents, including U.S. Patent No. 4,270,362 issued in June of 1981.

It appears that cooling-water-based Deluxe System units form a basis of Plaintiffs' Infringement Contentions, notwithstanding that the accused features of those systems had been widely and continuously promoted, sold and publicly used many years prior to the relevant priority dates.

No later than 1996, Liebert introduced its first Industrial Cooling Series System, which became another widely known environmental control system for data centers used throughout the industry. This system included many relevant features and functionalities (such as those identified in Charts B-21 and C-27) that had become widely known and commercially implemented by the time of the priority dates of the Asserted Patents. For example, Liebert's Industrial Cooling Series System determined the heating or cooling requirements of a room or data center based on one or more temperature setpoints and varied a flow of cooling fluid to meet those heating or cooling requirements. *See, e.g.*, LIEBERT, INDUSTRIAL COOLING SERIES OPERATION AND MAINTENANCE MANUAL, SL-18530 at 40 ("The temperature control program for the advanced microprocessor is based on a calculated % requirement for cooling/ heating . . . , the % requirement is determined by the difference between the return air temperature and the temperature setpoint."); *id.* at 3 ("These systems utilize a central chiller and control cooling by modulating a control valve in the chilled water line.").

On information and belief, no later than July 2001, Liebert introduced its DataCool System and the Rack Cooler System, which provide targeted cooling at the racks and became widely used throughout the data center and/or cooling industry. These systems included many relevant features and functionalities (such as those identified in Charts B-18 and B-22) that were widely known by

VALTRUS EXHIBIT 2022
VERTIV v. VALTRUS IPR2025-00667
15 of 214

the time of the priority dates of the Asserted Patents. For example, the DataCool System and the RackCooler System provide a "flexible, scalable and space-saving solution that adds targeted cooling capacity to the base environmental equipment—taking care of enclosure hot spots where they occur." LIEBERT, DATACOOL BROCHURE, SL-16700 (11/01) at 2; LIEBERT, RACKCOOLER BROCHURE, SL-16750 (11/01) at 2. These systems deployed a plurality of air-to-fluid heat exchangers to provide localized cooling at the racks, supplied chilled water as a cooling fluid to the heat exchangers, and provided for automatic control of the temperature of the cooling fluid and/or the flow rate of the cooling fluid, based on sensed temperature conditions in a data center. LIEBERT, DATACOOL BROCHURE, SL-16700 (11/01) at 4; LIEBERT, RACKCOOLER BROCHURE, SL-16750 (11/01) at 3-4. Cooling systems designed to automatically control the flow of cool air to different zones of a data center or building in response to sensed temperature data reflecting localized heat loads and cooling needs were also state-of-the-art as of the relevant priority dates. U.S. Patent No. 4,874,127, issued in October of 1989, is one of several references corroborating that it was well-known to deploy raised floor platforms for computer equipment integrated with temperature monitoring and control units operable to automatically adjust air flow partitions to direct controlled amounts of cooling to individual zones of the room based on localized heat loads.

It was also conventional practice as of the relevant priority dates to utilize commercially available thermal mapping software capable of processing sensed temperature data into a thermal map showing temperature contours throughout locations of a data center. *See, e.g.,* '277 Patent at 4:35-67. Computational fluid dynamics software tools for generating thermal maps and modeling other atmospheric parameters were also widely available and known to those skilled in the art), as was pattern recognition software for detecting differences in visually presented information. S*ee, id.* at 5:1-15; 6:36-59.

VALTRUS EXHIBIT 2022
VERTIV v. VALTRUS IPR2025-00667
16 of 214

It was also within the state of the art to model airflow and heat distribution characteristics of raised floor data center cooling systems using known thermodynamics and fluid dynamics principles and mathematical computations to understand the effect of geometric and operational parameters in relation to optimizing data center and cooling system designs. For example, inventors of the '870 Patent disclosed these very techniques, including mathematical formulas recited in the '870 Patent, in publications for the data center cooling industry in June 2002 and in April 2003. *See* Sharma I and Sharma II.

It was also well-known to use conventional temperature sensors, such as thermocouples, to sense temperatures at various locations within a room, and to control the flow of conditioned air based on the cooling needs of a data center. *See, e.g.,* '287 patent at 1:52-2:29; 6:63-7:9; 10:39-62. Programmable controllers for controlling temperature of the cooling fluid and/or the output of the heat exchange units were also conventional. S*ee, id.* at 3:49-57. Such controllers were also conventionally used to control operation of associated fans, pumps and valves. *See, e.g., id.* at 8:8-59. It was well-understood by POSITAs that such control systems should be set up to control air flow characteristics and/or cooling fluid temperature or flowrates to operate cooling systems at optimized levels. *See, e.g., id.* at 9:37-57.

The various types of conventionally available sensors included modular sensors with multiple sensor modules integrated into a single substrate and connectable via common wire to a centralized networked monitoring or control system. For example, Liebert's SiteNet Integrator product was commercially sold and publicly known and available as early as June of 1999. SiteNet Integrator provided a rack-deployed networked system for coordinating and monitoring uninterruptible power supply systems, environmental control systems, and monitoring systems, and supported numerous sensors including integrated temperature and humidity sensors connected

VALTRUS EXHIBIT 2022
VERTIV v. VALTRUS IPR2025-00667
17 of 214

by a common wire to a central system via a connector board. *See e.g.*, SiteNet Integrator LIEBERT, SNMP-BASED INTEGRATED REMOTE MONITORING AND LOAD CONTROL (Liebert Corporation Doc. No. SL-53100, 1997) at 2-3.

Various form factors for such multiple sensor assemblies were known and available. For example, European Patent Application No. 0278102 to McQuoid, published in August of 1988, reflects the understanding that it is often necessary to monitor the temperature at a plurality of points within a computer room. McQuoid at 1:23–30. McQuoid discloses a sensor assembly including a flexible cable with multiple discrete temperature sensing nodes distributed at desired points along the cable, each of which may be individually interrogated by a networked controller. *See, id*. at 2: 35-49 and 4:19-42.

Further details regarding relevant design, functions, features, principles of operation, and optimization of data center environmental control systems, widely known and available as of the respective priority dates of the Asserted Patents, are provided in the claim charts attached as A-1 *et seq.*, B-1 *et seq.*, C-1 *et seq.*, D-1 *et seq.*, E-1 *et seq.*, F-1 *et seq.*, and G-1 *et seq.*, and the references and other evidence cited therein.

V. P.R. 3-3(C) - INVALIDITY UNDER 35 U.S.C. §§ 102 AND 103

Each Asserted Claim of the Asserted Patents is invalid as anticipated by the prior art under various subsections of 35 U.S.C. § 102[1] and/or as obvious in view of the prior art under 35 U.S.C. § 103. Pursuant to P.R. 3-3(c), the charts attached to these invalidity contentions as charts A-1 *et seq.*, B-1 *et seq.*, C-1 *et seq.*, D-1 *et seq.*, E-1 *et seq.*, F-1 *et seq.*, and G-1 *et seq.*, set forth how

[1] Based on the priority dates of the Asserted Claims, Defendants apply sections 102 and 103 (pre-AIA).

VALTRUS EXHIBIT 2022
VERTIV v. VALTRUS IPR2025-00667
18 of 214

prior art identified by Defendants anticipates either expressly or inherently, and/or renders obvious, each Asserted Claim.

In the charts, Defendants cite various relevant portions of the identified prior art references, but other portions may contain additional or different support for a particular claim limitation, and thus may additionally anticipate, either expressly or inherently, and/or render obvious, one or more of the Asserted Claims. Persons of ordinary skill in the art at the time of the filing of the Asserted Patents knew to read references as a whole, and in the context of other publications and literature and the general knowledge in the field.

Defendants also reserve the right to rely on other references disclosed or incorporated by reference in these Invalidity Contentions, in prior art references identified or charted in these contentions, in the Asserted Patents, any patents or applications related to the Asserted Patents, in the file history of the Asserted Patents, or any related patents or applications. Defendants' claim charts may disclose multiple theories of invalidity in a single chart.

Each chart directed to an anticipatory product/system may also describe that the product/system alone, in light of the knowledge and skill in the art, or in light of one or more other prior art references, renders each Asserted Claim obvious. Where Defendants cite to a particular figure in a prior art reference, the citation should be understood to encompass the caption and description of the figure as well as any text relating to the figure in addition to the figure itself.

Conversely, where a cited portion of text refers to a figure, the citation should be understood to include the figure as well. Furthermore, while Defendants have generally identified at least one citation per limitation present in a reference or combination, every disclosure of the same or similar limitation in the same reference or combination is not necessarily identified. To

VALTRUS EXHIBIT 2022
VERTIV v. VALTRUS IPR2025-00667
19 of 214

focus the issues, Defendants cite particularly pertinent portions of identified references, even where a reference or combination may contain additional support for a particular claim element.

Thus, Defendants may rely on uncited portions of the prior art references for additional support or context for a particular element. Defendants may rely upon other prior art identified in future supplements, corroborating references, documentation, source code, products, and testimony, including materials obtained through further investigation and third-party discovery of the prior art identified herein, that demonstrates the invalidating functionality identified in these Invalidity Contentions or that show the state of the art in the relevant time period (irrespective of whether such references themselves qualify as prior art to the Asserted Patent), and expert testimony to provide context to or aid in understanding the cited portions of the identified prior art. Similarly, where there are multiple references relating to a single prior art product or system, Defendants may cite only to a single reference for a particular limitation, even though other references may also contain similar teachings. Thus, Defendants may rely on uncited references relating to a particular prior art document or system for additional support for a particular element. Any prior art disclosed as anticipating a limitation also renders that limitation obvious.

Additionally, persons of ordinary skill in the art at the time of the alleged inventions generally read a prior art reference as a whole and in the context of other publications and literature. Numerous prior art references, including those identified herein and in the attached exhibits, reflect common knowledge and the state, scope, and content of the prior art before the priority date of the Asserted Claims of the Asserted Patents. Defendants may rely on uncited portions of the prior art references and on other publications and expert testimony to provide context and as aids to understanding and interpreting the portions that are cited.

VALTRUS EXHIBIT 2022
VERTIV v. VALTRUS IPR2025-00667
20 of 214

In general, a claimed invention is invalid due to obviousness "if the differences between the claimed invention and the prior art are such that the claimed invention as a whole would have been obvious before the effective filing date of the claimed invention to a person having ordinary skill in the art." 35 U.S.C. § 103; *Graham v. John Deere Co.*, 383 U.S. 1, 13-14 (1966). The ultimate determination of whether an invention is or is not obvious is a legal conclusion based on underlying factual inquiries including: "(1) the scope and content of the prior art; (2) the differences between the prior art and the claims; (3) the level of ordinary skill in the art at the time of invention; and (4) objective evidence of nonobviousness." *See Miles Labs., Inc. v. Shandon, Inc.*, 997 F.2d 870, 877 (Fed. Cir. 1993); *Graham*, 383 U.S. at 17-18. The U.S. Supreme Court decision *KSR Int'l Co. v. Teleflex Inc.* reaffirmed Graham, 127 S. Ct. 1727, 1739 (2007), but further held that a claimed invention can be obvious even if there is no explicit teaching, suggestion, or motivation for combining the prior art to produce that invention.

To the extent that any claim limitation is not anticipated pursuant to 35 U.S.C. § 102, Defendants contend that any purported difference is such that the claimed subject matter as a whole would have been obvious to one skilled in the art at the time of the alleged inventions, in view of the state of the art and knowledge of those skilled in the art under 35 U.S.C. § 103. Each Asserted Claim would have been obvious in view of each reference cited in the attached Exhibits pertaining to that Asserted Patent, either alone or combined with the knowledge that was possessed by one of ordinary skill in the art. Additionally, each Asserted Claim would have been obvious to one of ordinary skill in the art in view of the combination of any one of the prior art references identified in the attached Exhibits with one or more of the other references identified or discussed in the same Exhibits. Defendants reserve the right to illustrate the knowledge of one of ordinary skill in the art

VALTRUS EXHIBIT 2022
VERTIV v. VALTRUS IPR2025-00667
21 of 214

using any of the prior art references identified throughout these Invalidity Contentions, expert testimony, learned treatises, and/or testimony of prior art fact witnesses.

Statements made by applicants of the Asserted Patents ("Applicants") in the specification and/or during prosecution of the Asserted Patents and any related patents/applications, such as in the "Background of the Invention" section that describes the related art known to Applicants, are admissions that can be relied upon for both anticipation and obviousness determinations, regardless of whether the admitted prior art would otherwise qualify as prior art under the statutory categories set forth in 35 U.S.C. § 102. *See* MPEP §§ 2129 and 608.01(c). To the extent Plaintiffs contend that the Asserted Claims are not invalid as anticipated by and/or obvious in view of the prior art under 35 U.S.C. §§ 102 and 103, Defendants reserve the right to rely on the inventors' admitted prior art to demonstrate the invalidity of the Asserted Claims.

Additionally, Defendants believe that certain non-parties and current or former employees thereof may have possession of relevant information and/or documents constituting prior art to the Asserted Patents, including parties in related litigations. Defendants are continuing the investigation into these and other companies and their products. Defendants reserve the right to supplement these Invalidity Contentions to identify additional references, combinations, motivations to modify, or explanations for particular references based on any information and/or documents provided by the former employees and/or successors-in-interests of companies or individuals who may possess relevant information and/or documents constituting prior art to the Asserted Patents.

The concepts disclosed and claimed in each of the Asserted Patents are not new, and had been disclosed, used, offered for sale, sold, and/or practiced by others prior to the claimed priority date of the patents. The prior art identified herein and in the claim charts, individually or in

VALTRUS EXHIBIT 2022
VERTIV v. VALTRUS IPR2025-00667
22 of 214

combination, invalidates the Asserted Claims under 35 U.S.C. §§ 102 (a), (b), (e), (g) and §103. Because discovery is ongoing, Defendants expect to gather additional information about the identified prior art, and other prior art, through third-party discovery or other discovery, and will thus amend and supplement these Invalidity Contentions once they obtain that discovery and have meaningful and reasonable time to analyze it. As described in more detail below, claims of the Asserted Patents are also invalid under 35 U.S.C. §§ 101 and 112.

Moreover, Defendants reserve the right to rely on inventor admissions concerning the scope of the prior art relevant to the Asserted Patents found in, inter alia, the prosecution histories of the Asserted Patents or related patents and/or patent applications, any testimony or declarations of the named inventors concerning the Asserted Patents or related patents, and any papers or evidence submitted by Plaintiffs in connection with this litigation, any other pending or future litigation brought by Plaintiffs involving the Asserted Patents or related patents, or *inter partes* review proceedings involving the Asserted Patents or related patents. Defendants also may establish what was known to a person having ordinary skill in the art ("POSITA") through references discussed above in connection with the state of the art and treatises, published industry standards, other publications, products, and/or testimony.

In this section, Defendants identify products and systems that were sold, on-sale or publicly used or disclosed before the priority dates of the respective Asserted Patents. The products and/or systems offered for sale or publicly disclosed, and related information known, are identified below and in the claim charts. The sales, sales offers, and public use or disclosures include those made by Vertiv's predecessor, Liebert Corporation, as well as by Automated Logic Corporation, Trane, and other entities identified in the charts below.

VALTRUS EXHIBIT 2022
VERTIV v. VALTRUS IPR2025-00667
23 of 214

The tables below and accompanying claim charts identify items offered for sale or publicly used and, based on the current investigation and information reasonably available to Defendants, the estimated timing of when the product or system was first marketed, made commercially available for sale, became known within the data center cooling industry, and/or was otherwise made public. The sales records being produced under Bates No. DBNP_0008268 AND TPNP_008269 provide additional details regarding particular sales of such products and systems to particular Liebert resellers and customers. As discovery and investigation continues, Defendants reserve the right to identify, disclose and/or make available for inspection, additional facts, documents and things concerning the prior art products and systems, including the identity of the product/system's purchasers or recipients[2], additional details regarding the features and functionalities of the products/systems, physical samples representative of the products/systems, and software and/or source code for the products/systems.

A. P.R. 3-3(C) Disclosures for the '277 Patent

1. Identification of Prior Art for the '277 Patent

Patent References

Chart	Patent Number	Citation	Country of Origin	Issue / Pub. Date
A-1	US2002/0149911	Bishop	US	October 17, 2002[3]
A-2	US6402043	Cockerill	US	June 6, 2011
A-3	WO1997/026507	Degani	PCT	July 24, 1997
A-4	US4850264	Kiser	US	July 25, 1989
A-5	US6283380	Nakanishi	US	Sept. 4, 2001
A-6	US6134511	Subbarao	US	Oct. 17, 2000

[2] Purchasers and recipients of Liebert products and systems include Liebert's resellers and customers.
[3] Bishop was filed April 12, 2001.

VALTRUS EXHIBIT 2022
VERTIV v. VALTRUS IPR2025-00667
24 of 214

Publications

Chart	Title	Author / Publisher	Date of Publication
A-7	Computational Fluid Dynamics Modeling of High Compute Density Data Centers to Assure System Inlet Air Specifications ("Patel")	Patel	July 13, 2001
A-8	Liebert SiteScan Product Brochure SL-27070	Liebert	Jan. 21, 1997
A-9	Liebert SiteScan User Manual SL-27091	Liebert	Nov. 1998
A-10	SuperVision for Windows V2.6A User Guide ("SuperVision User's Guide")	Automated Logic Corporation	Nov. 10, 1998
A-11	WebCTRL Installation Guide (2000)	Automated Logic Corporation	2000
A-12	SuperVision Plus User's Guide	Automated Logic Corporation	2000

Product Sales, Offers for Sale, and/or Public Use or Disclosures

Chart	Description	Entity	Sale / Disclosure Date
A-13	SuperVision for Windows V2.6A	Automated Logic Corporation	January 2001 (and earlier)
A-14	WebCTRL System	Automated Logic Corporation	2000
A-15	SuperVision Plus System	Automated Logic Corporation	2000
A-16	Liebert SiteScan System	Liebert	Nov. 1998

In addition, the below references are prior art to the '277 Patent and relevant to the state of the art, obviousness and the knowledge of a POSITA as of the '277 Patent priority date.

Patent/Publication No.	Country of Origin	Date of Issue/ Publication	Relevant Priority Date	Short Title
2003/0158718	US	August 21, 2003	February 19, 2002	Nakagawa
6,353,803	US	March 5, 2002	January 21, 1997	Degani 803
0 520 827	EP	December 30, 1992	June 26, 1992	Buchholz

VALTRUS EXHIBIT 2022
VERTIV v. VALTRUS IPR2025-00667
25 of 214

Patent/Publication No.	Country of Origin	Date of Issue/ Publication	Relevant Priority Date	Short Title
2 387 669	GB	October 22, 2003	April 16, 2002	Ferguson
2002/0014538	US	February 7, 2002	August 4, 2000	Weimer
2003/0050003	US	March 13, 2003	September 3, 2002	Charron '003
2003/0193777	US	October 16, 2003	April 16, 2002	Friedrich
5,467,607	US	November 21, 1995	February 22, 1994	Harvey
5,550,752	US	August 27, 1996	July 25, 1994	Federspiel
5,718,628	US	February 17, 1998	April 26, 1996	Nakazato
5,832,411	US	November 3, 1998	February 6, 1997	Schatzmann
6,374,627	US	April 23, 2002	January 9, 2001	Schumacher
6,711,470	US	March 23, 2004	November 16, 2000	Hartenstein
01/86217	WIPO	November 15, 2001	May 7, 2001	Spinazzola
4,916,642	US	April 10, 1990	January 14, 1987	Kiser 642
5,202,843	US	April 13, 1993	April 24, 1991	Kunimine
0 632 268	EP	April 1, 1995	June 28, 1994	Wenger
6,157,943	US	December 5, 2000	November 12, 1998	Meyer
7,574,323	US	August 11, 2009	December 17, 2001	Rappaport
5,345,779	US	September 13, 1994	April 23, 1993	Feeney
5,709,100	US	January 20, 1998	August 29, 1996	Baer
6,553,778	US	April 29, 2003	January 16, 2001	Tipton
5,590,062	US	December 31, 1996	June 21, 1994	Nagamitsu

VALTRUS EXHIBIT 2022
VERTIV v. VALTRUS IPR2025-00667
26 of 214

Title	Author/ Publisher	Date Published	Short Title
Dynamic Simulation Of A Building Central Chilling System And Evaluation Of EMCS On-Line Control Strategies	Wang/ Elsevier Science	1998	Wang – Dynamic Simulation
Efficient Thermal Management of Data Centers – Immediate and Long-Term Research Needs	Bash/HDAC &R Research	April 2003	Bash – Efficient Thermal Management
Energy Mapping and Analysis Procedures (EMAPs) as Building Diagnostics	Christensen/ SERI	April 1985	Christensen – EMAPs
A Methodology for the Design of Perforated Tiles in Raised Floor Data Centers Using Computational Flow Analysis	Kang/ IEEE	July 2001	Kang
Thermal Characteristics of Complex Systems	Di Ianni	1999	Di Ianni
The 2001 ASHRAE Handbook	Wessel/ ASHRAE	2001	ASHRAE Handbook
Habitat Monitoring: Application Driver for Wireless Communications Technology	Cerpa/ ACM SIGCOMM Computer Communicat ion Review	February 2001	Cerpa
The Future of Intelligent Buildings is Now: Minutes from a Roundtable Discussion	Ivanovich/ HPAC	May 1999	Ivanovich
Wireless Sensors Improve Data Center Energy Efficiency	U.S. Department of Energy	September 2010	DoE
Ventilation design: Use of computational fluid dynamics as a study tool	Chow / Building Services Engineering Research and Technology	November 3, 1994	Chow

VALTRUS EXHIBIT 2022
VERTIV v. VALTRUS IPR2025-00667
27 of 214

Description	Entity	Sale / Disclosure Date
Liebert Industrial Cooling Series System	Liebert	May 1996

2. The Asserted Claims of the '277 Patent Would Have Been Obvious

If not anticipated, the Asserted Claims of the '277 Patent would have been obvious. In particular, limitations, such as "generating an empirical atmospheric map from the results of said sensing step using software for processing input from said sensing step and for producing output in the form of said empirical atmospheric map," "comparing said empirical atmospheric map to a template atmospheric map," "identifying pattern differentials between said empirical and template atmospheric maps," "correlating at least one of the location, size, and intensity of said pattern differentials to at least one of the location of said plurality of vents, the speed of said at least one blower, and the capacity of said at least one source of conditioned air," "using thermal mapping software to process input from said sensing step and to produce output in the form of said empirical atmospheric map," "using pattern recognition software," "generating a map composed of temperature contours that define various isothermal regions," and "identifying pattern differentials between said empirical and template atmospheric maps comprises performing at least one of extrapolation and triangulation to determine locations of one or more hot spots," would have been obvious to a POSITA. For starters, the charted references in A-1 *et seq.* are single reference obviousness references in light of the knowledge of a POSITA. Further, a person having ordinary skill in the art would have been motivated to modify or combine the references discussed in charts A-1 *et seq.* based on the disclosures identified and/or information that would have been generally known to a POSITA with reasonable expectations of success. Rationales and/or motivations for such modifications or combinations include:

VALTRUS EXHIBIT 2022
VERTIV v. VALTRUS IPR2025-00667
28 of 214

- Combining the prior art elements according to known methods would have yielded predictable results.
- Simple substitution of one known limitation for another would have yielded predictable results.
- Use of a known technique to improve similar devices in the same ways.
- Applying a known technique to a known system ready for improvement.
- Choosing from a finite number of identified, predictable solutions, with a reasonable expectation of success.
- Variations based on known work in the field.
- Teachings, suggestions, and/or motivations provided in the references themselves.

In particular, the '277 Patent discloses "a method and system for controlling atmospheric conditions within a building." '277, Abstract. The alleged improvement relates to "substantially reducing the energy consumption associated with cooling a data center, by virtue of using directed, location-specific cooling instead of diffused, room-level cooling." *See, e.g.*, '277, 7:38-48. In other words, the '277 Patent purportedly seeks to promote cooling system efficiency and reduce operating costs, while ensuring multiple computing devices (in varying locations and with varying cooling needs) are sufficiently monitored and reliably cooled. *Id*. (noting the disclosed system "can be operated relatively more efficiently compared to the prior art by virtue of a more precise method of tracking and using actual temperature measurement as an input to cooling system control").

A POSITA would have been motivated by several factors, including:

- The need to reliably deliver sufficient cooling to data center racks in multiple zones of varying cooling needs.
- The desire to optimize the operation of cooling systems to provide effective cooling in an efficient manner.
- The known convenience and other benefits of providing visual representation and monitoring of atmospheric conditions such as operating temperatures and operational parameters associated with environmental control systems and cooling operations, such as via a map, chart, graphic, or the like.

VALTRUS EXHIBIT 2022
VERTIV v. VALTRUS IPR2025-00667
29 of 214

- A POSITA's knowledge of the fundamental technique of establishing predetermined desired atmospheric conditions, sensing current atmospheric conditions, and adjusting operating parameters to achieve the desired atmospheric conditions.
- A POSITA's knowledge of the utility of comparing a visual representation of actual atmospheric conditions against a visual representation of desired atmospheric conditions to evaluate and adjust the operation of a cooling system; and
- A POSITA's knowledge that making adjustments based on identified differences between actual and desired atmospheric conditions can help improve the effectiveness and efficiency of the cooling system.

Indeed, as shown below in this section, and in the corresponding claim charts, each of the prior art references recognize the need to achieve these objectives and provide solutions, including the use of temperature or atmospheric profiles or maps, similar to those of the '277 Patent. To the extent there are variations among the references in terms of how they achieve common objectives, such variations represent finite number alternative approaches that a POSITA would have reasonably understood would succeed. All told, the nature of these problems to be solved would have led a POSITA to incorporate any combination of the finite number of solutions disclosed, available and/or otherwise known with predictable results, an exercise involving nothing more than routine optimization of well-understood principles and components of cooling systems.

For example, Bishop discloses "an apparatus for providing cool air to electronic module cabinets" that includes the exemplary elements identified in the corresponding claim chart. Bishop, Abstract; Chart A-1. A POSITA would have been motivated to turn to Bishop, and/or combine it with references directed to similar objectives, for solutions that solve "the need for a more efficient cool air delivery system for use in critical environments," and in particular, the "need for an air delivery system that can automatically alter air volume to module cabinets based on cabinet and/or component temperature." Bishop, ¶0032.

Cockerill discloses "devices for optimally controlling the activation of furnaces, ventilation units and air conditioners" that include the exemplary elements identified in the corresponding

VALTRUS EXHIBIT 2022
VERTIV v. VALTRUS IPR2025-00667
30 of 214

claim chart. Cockerill, 1:5-9, Abstract; Chart A-2. A POSITA would have been motivated to turn to Cockerill, and/or combine it with references directed to similar objectives, for solutions that "more exactly control the temperature setting of [an] HVAC unit" so that "the HVAC unit itself is [] controlled in an efficient manner." Cockerill, 1:61-2:3.

Degani discloses "a novel testing apparatus for determining the efficiency of a heating and/or cooling system, and the like, for testing or controlling a system in which fluid flows and where in the system fluid either dissipates in part or requires regeneration." Degani, 1; Chart A-3. A POSITA would have been motivated to turn to Degani, and/or combine it with references directed to similar objectives, for solutions that "provide an apparatus or a machine, and a correlated method, for monitoring a system, in which a fluid is flowing, with time in space, which will provide more conclusive results regarding system anomalies or system efficiency." Degani, 2.

Kiser discloses "[a]n improved system for maintaining atmospheric conditions within prescribed parameters throughout the interior of a building," that includes the exemplary elements identified in the corresponding claim chart. Kiser, Abstract; Chart A-4. More specifically, Kiser describes a "ductless system for conditioning the air within the interior of an enclosed building [wherein] air is emitted at various points around the perimeter of the building in controlled amounts in response to observed atmospheric conditions at corresponding locations within the building. Kiser, 1:5-18. A POSITA would have been motivated to turn to Kiser, and/or combine it with references directed to similar objectives, for solutions that "provide an improved system for the . . . air conditioning of industrial-type buildings," "assure that atmospheric conditions will be continuously maintained within prescribed parameters throughout the building" "provide such a

VALTRUS EXHIBIT 2022
VERTIV v. VALTRUS IPR2025-00667
31 of 214

system which is relatively inexpensive to install, operate, and maintain . . . and extremely energy efficient." *Id.*, 2:62-3:13.

Nakanishi discloses "an air conditioning system and an air conditioning method . . . for quickly and effectively controlling the temperature in a room requiring cooling and keeping the room at a uniform temperature." Nakanishi, Abstract. Disclosed embodiments include the exemplary elements identified in the corresponding claim chart. *See* Chart A-5. A POSITA would have been motivated to turn to Nakanishi, and/or combine it with references directed to similar objectives, for solutions capable of "quickly responding to the fluctuation of temperature distribution in a computer room, properly controlling a temperature, and keeping an optimum temperature state." Nakanishi, 1:35-50.

Subbarao discloses "a method and apparatus for applying corrective flows to better calibrate an audit building to the actual building" that include the exemplary elements identified in the corresponding claim chart. Subbarao, 1:5-11; Chart A-6. A POSITA would have been motivated to turn to Subbarao, and/or combine it with references directed to similar objectives, for solutions that "enable the evaluation, commissioning, diagnostics, and optimal control of buildings," "use of any building energy simulator," and "address the building shell as well as HVAC (Heating, Ventilation and Air-Conditioning) systems." Subbarao, 3:28-40.

Patel discloses modeling of "the air flow and temperature distribution in a data center." Patel, 1. Disclosed embodiments include the exemplary elements identified in the corresponding claim chart. *See* Chart A-7. A POSITA would have been motivated to turn to Patel, and/or combine it with references directed to similar objectives, to better understand "fluid mechanics and heat transfer processes inside the data center," including the identification of "'hot spots' in the room." Patel, 2.

VALTRUS EXHIBIT 2022
VERTIV v. VALTRUS IPR2025-00667
32 of 214

The prior art Liebert SiteScan system identified in chart A-16 was a widely known data center environmental control system used throughout the industry. A POSITA would have known of Liebert's solutions and understood their features and improvements to achieve objectives relating to efficiently supplying cooling fluid to computing racks in data centers. Therefore, a POSITA would have been motivated to combine these systems' known features with references directed to similar objectives. Similarly, a POSITA would have been motivated to consult widely available Liebert literature relating to its systems, such as the literature disclosed in chart A-8 and A-9 for similar reasons. Likewise, products and systems from Automated Logic Corporation ("ALC") relating to efficiently supplying cooling fluid to computing racks in data centers, such as the SuperVision, WebCTRL, and SuperVision Plus systems identified in charts A-13, A-14 and A-15, were also widely known at the time and a POSITA would have been motivated to consult widely available ALC literature relating to its systems, such as the literature disclosed in chart A-10, A-11, and A-12.

Furthermore, a POSITA would have been motivated to combine with reasonable expectations of success, based on the disclosures identified therein and/or information that would have been generally known to a POSITA, any of the primary references A-1 *et. seq.* charted above with: (1) any other such A-1 *et seq.* primary reference(s); (2) any reference disclosed in the section above for specific concepts claimed in the patent; (3) any statements made in the intrinsic record of the '277 Patent, and/or (4) the knowledge of one of ordinary skill in the art. By way of example and without prejudice to any other combinations of references, Defendants provide the following exemplary combinations, which would obviate the invention of the '277 Patent.

VALTRUS EXHIBIT 2022
VERTIV v. VALTRUS IPR2025-00667
33 of 214

Exemplary Reference Combinations

Reference	In Combination With	Claims
Bishop	Cockerill Degani Kiser Nakanishi Subbarao Patel Liebert SiteScan Product Brochure SL-27070 Liebert SiteScan User Manual SL-27091 SuperVision User's Guide WebCTRL Installation Guide (2000) SuperVision Plus User's Guide	1-11, 12-21
Cockerill	Bishop Degani Kiser Nakanishi Subbarao Patel Liebert SiteScan Product Brochure SL-27070 Liebert SiteScan User Manual SL-27091 SuperVision User's Guide WebCTRL Installation Guide (2000) SuperVision Plus User's Guide	1-11, 12-21
Degani	Bishop Cockerill Kiser Nakanishi Subbarao Patel Liebert SiteScan Product Brochure SL-27070 Liebert SiteScan User Manual SL-27091 SuperVision User's Guide WebCTRL Installation Guide (2000) SuperVision Plus User's Guide	1-11, 12-21

VALTRUS EXHIBIT 2022
VERTIV v. VALTRUS IPR2025-00667
34 of 214

Reference	In Combination With	Claims
Kiser	Bishop Cockerill Degani Nakanishi Subbarao Patel Liebert SiteScan Product Brochure SL-27070 Liebert SiteScan User Manual SL-27091 SuperVision User's Guide WebCTRL Installation Guide (2000) SuperVision Plus User's Guide	1-11, 12-21
Nakanishi	Bishop Cockerill Degani Kiser Subbarao Patel Liebert SiteScan Product Brochure SL-27070 Liebert SiteScan User Manual SL-27091 SuperVision User's Guide WebCTRL Installation Guide (2000) SuperVision Plus User's Guide	1-11, 12-21
Subbarao	Bishop Cockerill Degani Kiser Nakanishi Patel Liebert SiteScan Product Brochure SL-27070 Liebert SiteScan User Manual SL-27091 SuperVision User's Guide WebCTRL Installation Guide (2000) SuperVision Plus User's Guide	1-11, 12-21
Patel	Bishop Cockerill Degani Kiser Nakanishi Subbarao Liebert SiteScan Product Brochure SL-27070 Liebert SiteScan User Manual SL-27091 SuperVision User's Guide WebCTRL Installation Guide (2000) SuperVision Plus User's Guide	1-11, 12-21

VALTRUS EXHIBIT 2022
VERTIV v. VALTRUS IPR2025-00667
35 of 214

Reference	In Combination With	Claims
Liebert SiteScan Product Brochure SL-27070	Bishop Cockerill Degani Kiser Nakanishi Subbarao Patel Liebert SiteScan User Manual SL-27091 SuperVision User's Guide WebCTRL Installation Guide (2000) SuperVision Plus User's Guide	1-11, 12-21
Liebert SiteScan User Manual SL-27091	Bishop Cockerill Degani Kiser Nakanishi Subbarao Patel Liebert SiteScan Product Brochure SL-27070 SuperVision User's Guide WebCTRL Installation Guide (2000) SuperVision Plus User's Guide	1-11, 12-21
SuperVision User's Guide	Bishop Cockerill Degani Kiser Nakanishi Subbarao Patel Liebert SiteScan Product Brochure SL-27070 Liebert SiteScan User Manual SL-27091 WebCTRL Installation Guide (2000) SuperVision Plus User's Guide	1-11, 12-21
WebCTRL Installation Guide (2000)	Bishop Cockerill Degani Kiser Nakanishi Subbarao Patel Liebert SiteScan Product Brochure SL-27070 Liebert SiteScan User Manual SL-27091 SuperVision User's Guide SuperVision Plus User's Guide	1-11, 12-21

VALTRUS EXHIBIT 2022
VERTIV v. VALTRUS IPR2025-00667
36 of 214

Reference	In Combination With	Claims
SuperVision Plus User's Guide	Bishop Cockerill Degani Kiser Nakanishi Subbarao Patel Liebert SiteScan Product Brochure SL-27070 Liebert SiteScan User Manual SL-27091 SuperVision User's Guide WebCTRL Installation Guide (2000)	1-11, 12-21
SuperVision for Windows V2.6A	Bishop Cockerill Degani Kiser Nakanishi Subbarao Patel Liebert SiteScan Product Brochure SL-27070 Liebert SiteScan User Manual SL-27091 WebCTRL Installation Guide (2000) SuperVision Plus User's Guide	1-11, 12-21
SuperVision Plus System	Bishop Cockerill Degani Kiser Nakanishi Subbarao Patel Liebert SiteScan Product Brochure SL-27070 Liebert SiteScan User Manual SL-27091 SuperVision User's Guide WebCTRL Installation Guide (2000)	1-11, 12-21
WebCTRL System	Bishop Cockerill Degani Kiser Nakanishi Subbarao Patel Liebert SiteScan Product Brochure SL-27070 Liebert SiteScan User Manual SL-27091 SuperVision User's Guide SuperVision Plus User's Guide	1-11, 12-21

VALTRUS EXHIBIT 2022
VERTIV v. VALTRUS IPR2025-00667
37 of 214

Reference	In Combination With	Claims
Liebert SiteScan System	Bishop Cockerill Degani Kiser Nakanishi Subbarao Patel SuperVision User's Guide WebCTRL Installation Guide (2000) SuperVision Plus User's Guide	1-11, 12-21

B. P.R. 3-3(C) Disclosures for the '287 Patent

1. Identification of Prior Art for the '287 Patent

Patent References

Chart	Patent Number	Citation	Country of Origin	Issue / Pub. Date
B-1	US6006528	Arima	US	December 28, 1999
B-2	US2001/0042616	Baer	US	Nov. 22, 2001
B-3	US5467609	Feeney	US	Nov. 21, 1995
B-4	CN1043380	Kunin	CN	June 27, 1990
B-5	US4270362	Lancia	US	June 2, 1981
B-6	JPH04350444A	Matsuo	JP	December 4, 1992
B-7	EP 0741269	Nakazato '269	EP	Nov. 21, 2001
B-8	US3384155	Newton	US	May 21, 1968
B-9	US6574104	Patel '104	US	June 3, 2003
B-10	US4259847	Pearse	US	April 7, 1981
B-11	US4688390	Sawyer	US	August 25, 1987
B-12	US5142877	Shimizu I	US	September 1, 1992
B-13	US5317907	Shimizu II	US	June 7, 1994
B-14	EP0482629	Suzuki	EP	April 29, 1992

Publications

Chart	Title	Author / Publisher	Date of Publication
B-15	Liebert Deluxe System/3 Operation and Maintenance Manual, SL-18350 (Revised April 2000) ("DS/3 Operation Manual 2000")	Liebert	2000

VALTRUS EXHIBIT 2022
VERTIV v. VALTRUS IPR2025-00667
38 of 214

Chart	Title	Author / Publisher	Date of Publication
B-16	Liebert Industrial Cooling Series Operation and Maintenance Manual, SL-18530 ("ICS Operation Manual")	Liebert	1998
B-17	Liebert RackCooler Brochure, SL-16750 (11/01) ("RackCooler Brochure")	Liebert	Nov. 2001

Product Sales, Offers for Sale, and/or Public Use or Disclosures

Chart	Description	Entity	Sale / Disclosure Date
B-18	Liebert DataCool System	Liebert	July 2001
B-19	Liebert Deluxe System/3 Cooling Water System - CW	Liebert	April 1983
B-20	Liebert Deluxe System / DX System - DX	Liebert	April 1983
B-21	Liebert Industrial Cooling Series System	Liebert	May 1996
B-22	Liebert Rack Cooler System	Liebert	July 2001

In addition, the below references are prior art to the '287 Patent and relevant to the state of the art, obviousness and the knowledge of a POSITA as of the '287 Patent priority date.

Patent/Publication No.	Country of Origin	Date of Issue/ Publication	Relevant Priority Date	Short Title
5,261,483	US	November 16, 1993	January 15, 1992	Imaoka
0 449 628	EP	October 2, 1991	March 28, 1991	Kabushiki
0 965 799	EP	December 22, 1999	June 19, 1996	Pollak-Diener
2 644 228	FR	September 14, 1990	March 13, 1989	Gerber
2003-139351	JP	May 14, 2003	November 6, 2001	Kawai
0486908	JP	March 19, 1992	July 30, 1990	Ohashi
974415	SU	November 15, 1982	May 29, 1981	Guzman

VALTRUS EXHIBIT 2022
VERTIV v. VALTRUS IPR2025-00667
39 of 214

Patent/Publication No.	Country of Origin	Date of Issue/ Publication	Relevant Priority Date	Short Title
2003/0221821	US	December 4, 2003	May 31, 2002	Patel 821
4,830,274	US	May 16, 1989	November 8, 1988	Johnson
5,718,628	US	February 17, 1998	April 26, 1996	Nakazato
5,788,570	US	August 4, 1998	May 2, 1997	Cho
6,167,714	US	January 2, 2001	February 4, 2000	Baffes
02/16854	WIPO	February 28, 2002	August 23, 2001	Spinazzola
08105647	JP	April 23, 1996	October 3, 1994	Adachi
3,525,385	US	August 25, 1970	February 9, 1966	Liebert
05118580	JP	May 14, 1993	October 30, 1991	Sato
6,557,624	US	May 6, 2003	August 9, 2000	Stahl
4,182,484	US	January 8, 1980	April 24, 1978	Stanke
4,103,508	US	August 1, 1978	February 4, 1977	Apple
5,131,236	US	July 21, 1992	October 3, 1991	Wruck
5,138,842	US	August 18, 1992	October 3, 1991	Wruck 842
5,345,779	US	September 13, 1994	April 23, 1993	Feeney
5,709,100	US	January 20, 1998	August 29, 1996	Baer
5,984,002	US	November 16, 1999	August 29, 1995	Kido
6,553,778	US	April 29, 2003	January 16, 2001	Tipton

VALTRUS EXHIBIT 2022
VERTIV v. VALTRUS IPR2025-00667
40 of 214

Title	Author/ Publisher	Date Published	Short Title
Split Systems: A Primer	Legutko / Carrier Corporation	September 2000	Legutko
Choosing the Best Controls for Commercial Rooftop Applications: Electromechanical vs. Electronic Thermostats	Scott-Younis/ Carrier Corporation	December 1998	Scott-Younis

Description	Entity	Sale / Disclosure Date
York Curbpak Air Handling Units	York International	2001
Trane Tracer Summit Building Automation System	The Trane Company	January 2000
Carrier ComfortID System	Carrier Corporation	1999
Carrier VAV Fan Terminal Zone Controller	Carrier Corporation	1999
Trane CenTraVac Liquid Chillers	The Trane Company	January 1999
Liebert SiteScan SS2W for Windows Monitoring System	Liebert Corporation	1998
Liebert UPStation S3 UPS	Liebert Corporation	1998
Trane VariTrane Products	The Trane Company	December 1999
Trane Underfloor Air Distribution System	The Trane Company	2001

2. The Asserted Claims of the '287 Patent Would Have Been Obvious

If not anticipated, the Asserted Claims of the '287 Patent would have been obvious. In particular, limitations, such as "a plurality of heat exchanger units," "controlling at least one of the temperature of said cooling fluid and said air delivery by said plurality of heat exchanger units to said room in response to said sensed temperatures at said one or more locations," "individually manipulating a mass flow rate of the cooling fluid supplied to each of the plurality of heat exchanger units," "determining whether the sensed temperatures at one or more locations in said room are within a predetermined range," "increasing said cooling fluid temperature in response to a sum of the sensed temperatures at one or more locations being below said predetermined range,"

VALTRUS EXHIBIT 2022
VERTIV v. VALTRUS IPR2025-00667
41 of 214

"decreasing said cooling fluid temperature in response to a sum of the sensed temperatures at one or more locations being above said predetermined range," "metering the flow of cooling fluid through each of said plurality of heat exchanger units with a plurality of valves positioned along respective cooling fluid lines configured to channel cooling fluid from the air conditioning unit to the plurality of heat exchanger units" and/or " metering the flow of cooling fluid through said plurality of heat exchanger units with a plurality of pumps positioned along respective cooling fluid lines configured to channel cooling fluid from the air conditioning unit to the plurality of heat exchanger units," would have been obvious to a POSITA. For starters, the charted references in B-1 *et seq.* are single reference obviousness references in light of the knowledge of a POSITA. Furthermore, a person having ordinary skill in the art would have been motivated to modify or combine the references discussed in charts B-1 *et seq.* based on the disclosures identified and/or information that would have been generally known to a POSITA with reasonable expectations of success. Rationales and/or motivations for such modifications or combinations include:

- Combining the prior art elements according to known methods would have yielded predictable results.
- Simple substitution of one known limitation for another would have yielded predictable results.
- Use of a known technique to improve similar devices in the same ways.
- Applying a known technique to a known system ready for improvement.
- Choosing from a finite number of identified, predictable solutions, with a reasonable expectation of success.
- Variations based on known work in the field.
- Teachings, suggestions, and/or motivations provided in the references themselves.

In particular, the '287 Patent discloses a "system and method for cooling a room configured to house a plurality of computer systems." '287, Abstract. The alleged improvement relates to

VALTRUS EXHIBIT 2022
VERTIV v. VALTRUS IPR2025-00667
42 of 214

"means for cooling air . . . and measuring temperatures . . . and controlling delivery of the cooled air in response to the temperature measurements and means for controlling the temperature of the cooling fluid." '287, 2:59-3:2. In other words, the '287 patent seeks to promote data center cooling systems efficiency and reduce operating costs by monitoring local cooling needs and operating cooling components "according to the actual needs" instead of "at substantially 100 percent of the anticipated heat dissipation from the computer systems." *Id.*, 3:57-67.

A POSITA would have been motivated by several factors, including:

- The need to reliably deliver sufficient cooling to data center racks in multiple zones.
- The conventional practice of monitoring operating temperatures and cooling operations.
- The need to improve the "efficiency," or minimize excess operating expenses associated with the cooling operations within a data center.
- The known approach and benefits of using a plurality of heat exchanger units to more accurately and efficiently deploy cooling to zones, regions, sections, or racks within the data center independent of coolant supplied to other managed zones, regions, sections, or racks within the data center consistent with the current conditions of the various specific zones, regions, sections, or racks.
- The known and conventional approach of sensing temperatures at one or more locations within the data center so that cooling operations can be more efficiently tailored based upon actual and anticipated cooling requirements within specific zones, regions, sections, or racks within the data center.
- A POSITA's knowledge that use of a plurality of heat exchanger units can help improve the efficiency of a cooling operation within a room, building, or similar, by, for example, providing greater cooling in a specific section of a room that is prone to warmer temperatures.
- A POSITA's knowledge that the efficiency of a cooling operation within a room, building, or similar can be improved by the addition of a plurality of vents, heat exchangers, air conditioning units, or similar components.
- A POSITA's knowledge that prior art and practices directed to heating applications can also be used in cooling applications.
- A POSITA's knowledge that achieving a desired temperature in a zone or region by moving a heating or cooling fluid through an HVAC system is a function of the

VALTRUS EXHIBIT 2022
VERTIV v. VALTRUS IPR2025-00667
43 of 214

temperature of the cooling fluid, the flow characteristics of the fluid, the pressure differential of the fluid across the HVAC system, and the air flow characteristics, such that one or more variables may be changed to achieve a desired temperature conditions at various locations.

- A POSITA's knowledge that achieving a desired temperature in a zone or region may be achieved by manipulating a mass flow rate of a cooling fluid through an HVAC system and/or the air flow characteristics.
- A POSITA's knowledge that the mass flow rate of a cooling fluid through an HVAC system may be manipulated in a variety of ways, including pumps, values, or any number of combinations involving both pumps and valves.

Indeed, as shown below in this section, and in the corresponding claim charts, each of the prior art references recognize the need to achieve these objectives and provide solutions similar to those of the '287 Patent. Further, as provided in the corresponding claim charts, it was widely known to address these objectives by varying the supply of cooling fluid, cooling fluid temperature, and/or airflow characteristics based on sensor readings in the manner contemplated by the '287 Patent. To the extent there are variations among the references in terms of how they achieve common objectives, such variations represent finite number alternative approaches that a POSITA would have reasonably understood would succeed. All told, the nature of these problems to be solved would have led a POSITA to incorporate any combination of the finite number of solutions disclosed, available and/or otherwise known with predictable results, an exercise involving nothing more than routine optimization of well-understood principles and components of cooling systems.

For example, Arima discloses "an air conditioning system for circulating a fluid." Arima, Abstract. Disclosed embodiments include the exemplary elements identified in the corresponding claim chart. *See* Chart B-1. A POSITA would have been motivated to turn to Arima, and/or combine it with references directed to similar objectives, for solutions capable of "provide a system capable of performing an optimum flow circulation." Arima, 3:5-12.

VALTRUS EXHIBIT 2022
VERTIV v. VALTRUS IPR2025-00667
44 of 214

Baer discloses an "apparatus and method for cooling the air exiting an electronics enclosure" that includes the exemplary elements identified in the corresponding claim chart. Baer, Abstract; Chart B-2. A POSITA would have been motivated to turn to Baer, and/or combine it with references directed to similar objectives, for solutions that "provide more efficient cooling than is available from prior art devices and techniques." Baer, Abstract.

Feeney discloses "a floor supported sub-structure system and module assemblage serving to operationally support computer system components, particularly of the incrementally expandable, rack mounted variety" that includes the exemplary elements identified in the corresponding claim chart. Feeney, 2:26-62; Chart B-3. A POSITA would have been motivated to turn to Feeney, and/or combine it with references directed to similar objectives, for solutions that can accommodate "environmental and power input demands [that] can be achieved on a practical cost basis." Feeney, 2:14-23.

Kunin discloses a "multi-room air conditioning device [that] is suitable for cooling or heating a plurality of rooms at the same time" that includes the exemplary elements identified in the corresponding claim chart. Kunin, [0001]; Chart B-4. A POSITA would have been motivated to turn to Kunin, and/or combine it with references directed to similar objectives, for solutions that "provide an improved air conditioning apparatus which is capable of performing not only simultaneous cooling operation and simultaneous room heating operation for a plurality of arbitrarily selected room units, but also simultaneous room cooling and heating operation." Kunin, [0007].

Lancia discloses "temperature and humidity electrical/electronic control circuits and apparatus to maintain a room at a constant temperature and humidity" that include the exemplary elements identified in the corresponding claim chart. Lancia, Abstract; Chart B-5. A POSITA

VALTRUS EXHIBIT 2022
VERTIV v. VALTRUS IPR2025-00667
45 of 214

would have been motivated to turn to Lancia, and/or combine it with references directed to similar objectives, for a solution "capable of responding to a correspondingly broad range of temperature conditions both within the zone" while ensuring "energy conservation is enhanced." Lancia, 2:47-58.

Matsuo discloses "a multiplex air-conditioning apparatus." Matsuo, Abstract. Disclosed embodiments include the exemplary elements identified in the corresponding claim chart. *See* Chart B-6. A POSITA would have been motivated to turn to Matsuo, and/or combine it with references directed to similar objectives, for solutions capable of providing "an air conditioner capable of flexibly performing air-conditioning suitable for each individual even when there is a change in the division of each floor for different tenants and/or even when the there is a change in the layout in a single office." Matsuo, ¶0012.

Nakazato '269 discloses "an air conditioning method . . . in which a cooling air is supplied through an air passageway formed below a floor into a forced air-cooling equipment disposed on the floor." Nakazato '269, 1:1-5. Disclosed embodiments include the exemplary elements identified in the corresponding claim chart. *See* Chart B-7. A POSITA would have been motivated to turn to Nakazato '269, and/or combine it with references directed to similar objectives, for that "provide an air conditioning method which permits cooling an equipment within a room without fail, while reducing the facility cost and operating cost, and also permits improving the temperature distribution within the machine room." Nakazato '269, 1:53-2:2.

Newton discloses "[a]n air conditioning system in which a heated and chilled liquid heat exchange medium is alternately made available to the heat exchange units in various zones." Newton, Abstract. Disclosed embodiments include the exemplary elements identified in the corresponding claim chart. *See* Chart B-8. A POSITA would have been motivated to turn to

VALTRUS EXHIBIT 2022
VERTIV v. VALTRUS IPR2025-00667
46 of 214

Newton, and/or combine it with references directed to similar objectives, for solutions that "provide a low-cost air conditioning system in which the temperature in various zones can be individually controlled . . . [or] a system in which the heated or chilled water is alternately made available to the room air conditioning units during periods when some rooms require cooling and others require heating to enable proper operation of a heat pump system having a plurality of independently activated zone heat exchangers." Newton, 2:27-40.

Patel '104 discloses a cooling system "configured to adjust cooling fluid flow to various racks located throughout a data center based upon the detected or anticipated temperatures at various locations throughout the data center." Patel '104, Abstract. Disclosed embodiments include the exemplary elements identified in the corresponding claim chart. *See* Chart B-9. A POSITA would have been motivated to turn to Patel '104, and/or combine it with references directed to similar objectives, for solutions related to "energy efficient utilization of a cooling system by operating them substantially only as needed," individually varying "cooling fluid supply . . . in accordance with actual or anticipated temperatures of the heat generating components" and substantially lowering "costs associated with operating the cooling system." Patel '104, 2:64-3:13.

Pearse discloses an air conditioning system with a stepped reduction in cooling capacity, "involve[ing] both a stepped reduction of blower capacity and a stepped change of the heat exchange fluid flow at the heat exchanger modifying the temperature of the air," in response to reduced sensible air conditioning demand. Pearse, Abstract. Disclosed embodiments include the exemplary elements identified in the corresponding claim chart. *See* Chart B-10. A POSITA would have been motivated to turn to Pearse, and/or combine it with references directed to similar objectives, for solutions related to "provid[ing] air conditioning system with improved energy efficiency by operating the blower at reduced capacity" and /or "a constant volume air conditioning

VALTRUS EXHIBIT 2022
VERTIV v. VALTRUS IPR2025-00667
47 of 214

system which has a low initial cost, improved operating effi ciency and improved humidity control." Pearse, 1:52–68.

Sawyer discloses a "heat pump system for selectively heating or cooling a plurality of zones with a corresponding plurality of zone heat exchangers." Sawyer, Abstract. Disclosed embodiments include the exemplary elements identified in the corresponding claim chart. *See* Chart B-11. A POSITA would have been motivated to turn to Sawyer, and/or combine it with references directed to similar objectives, for solutions "to enable proper operation of a heat pump system having a plurality of independently activated zone heat exchangers." Sawyer, 2:16-22.

Shimizu I discloses "a multiple type air conditioning system including a plurality of internal units (air conditioning units) and one external unit (refrigerant supply unit) which respectively supplies refrigerant to the plurality of internal units." Shimizu I, 1:10-15. Disclosed embodiments include the exemplary elements identified in the corresponding claim chart. *See* Chart B-12. A POSITA would have been motivated to turn to Shimizu I, and/or combine it with references directed to similar objectives, for solutions capable of "distribut[ing] an appropriate amount of refrigerant to each internal unit of a multiple type air conditioning system." Shimizu I, 1:45-52.

Shimizu II discloses "a multi-type air-conditioning apparatus having a plurality of air-conditioning units connected to an outdoor unit." Shimizu II, 1:9-12. Disclosed embodiments include the exemplary elements identified in the corresponding claim chart. *See* Chart B-13. A POSITA would have been motivated to turn to Shimizu II, and/or combine it with references directed to similar objectives, for solutions capable of achieving an "optimum capability corresponding to the number of personal air-conditioning units to be driven" while providing a "comfortable air-conditioned environment." Shimizu II, 2:5-14.

VALTRUS EXHIBIT 2022
VERTIV v. VALTRUS IPR2025-00667
48 of 214

Suzuki discloses "a multiple-system air-conditioning apparatus that air-conditions a plurality of living spaces." Suzuki, 1:5-7. Disclosed embodiments include the exemplary elements identified in the corresponding claim chart. *See* Chart B-14. A POSITA would have been motivated to turn to Suzuki, and/or combine it with references directed to similar objectives, for solutions capable of "improving the efficiency and reliability of a refrigeration cycle . . . and comfortably air-conditioning a plurality of rooms without fluctuating room temperatures even under light loads." Suzuki, 3:56-4:3.

The prior art Liebert Systems identified in charts B-18 – B-22 were widely known data center environmental control systems deployed and used throughout the industry. A POSITA would have known of Liebert's solutions and understood their features and improvements to achieve objectives relating to efficiently supplying cooling fluid to computing racks in data centers. Therefore, a POSITA would have been motivated to combine these systems' known features with references directed to similar objectives. Similarly, a POSITA would have been motivated to consult widely available Liebert literature relating to its systems, such as the literature disclosed in charts B-15 – B-17, for similar reasons.

Furthermore, a POSITA would have been motivated to combine with reasonable expectations of success, based on the disclosures identified therein and/or information that would have been generally known to a POSITA, any of the primary references B-1 *et. seq.* charted above with: (1) any other such B-1 *et seq.* primary reference(s); (2) any reference disclosed in the section above for specific concepts claimed in the patent; (3) any statements made in the intrinsic record of the patent, and/or (4) the knowledge of one of ordinary skill in the art. By way of example and without prejudice to any other combinations of references, Defendants provide the following exemplary combinations, which would obviate the invention of the '287 Patent.

VALTRUS EXHIBIT 2022
VERTIV v. VALTRUS IPR2025-00667
49 of 214

Exemplary Reference Combinations

Reference	In Combination With	Claims
Arima	Baer Feeney Kunin Lancia Matsuo Nakazato ’269 Newton Patel ’104 Pearse Sawyer Shimizu I Shimizu II Suzuki DS/3 Operation Manual 2000 ICS Operation Manual RackCooler Brochure	1-9
Baer	Arima Feeney Kunin Lancia Matsuo Nakazato ’269 Newton Patel ’104 Pearse Sawyer Shimizu I Shimizu II Suzuki DS/3 Operation Manual 2000 ICS Operation Manual RackCooler Brochure	1-9

VALTRUS EXHIBIT 2022
VERTIV v. VALTRUS IPR2025-00667
50 of 214

Reference	In Combination With	Claims
Feeney	Arima Baer Kunin Lancia Matsuo Nakazato ’269 Newton Patel ’104 Pearse Sawyer Shimizu I Shimizu II Suzuki DS/3 Operation Manual 2000 ICS Operation Manual RackCooler Brochure	1-9
Kunin	Arima Baer Feeney Lancia Matsuo Nakazato ’269 Newton Patel ’104 Pearse Sawyer Shimizu I Shimizu II Suzuki DS/3 Operation Manual 2000 ICS Operation Manual RackCooler Brochure	1-9

VALTRUS EXHIBIT 2022
VERTIV v. VALTRUS IPR2025-00667
51 of 214

Reference	In Combination With	Claims
Lancia	Arima Feeney Kunin Matsuo Nakazato ’269 Newton Patel ’104 Pearse Sawyer Shimizu I Shimizu II Suzuki DS/3 Operation Manual 2000 ICS Operation Manual RackCooler Brochure	1-9
Matsuo	Arima Feeney Kunin Lancia Nakazato ’269 Newton Patel ’104 Pearse Sawyer Shimizu I Shimizu II Suzuki DS/3 Operation Manual 2000 ICS Operation Manual RackCooler Brochure	1-9

VALTRUS EXHIBIT 2022
VERTIV v. VALTRUS IPR2025-00667
52 of 214

Reference	In Combination With	Claims
Nakazato ’269	Arima Baer Feeney Kunin Lancia Matsuo Newton Patel ’104 Pearse Sawyer Shimizu I Shimizu II Suzuki DS/3 Operation Manual 2000 ICS Operation Manual RackCooler Brochure	1-9
Newton	Arima Baer Feeney Kunin Lancia Matsuo Nakazato ’269 Patel ’104 Pearse Sawyer Shimizu I Shimizu II Suzuki DS/3 Operation Manual 2000 ICS Operation Manual RackCooler Brochure	1-9

VALTRUS EXHIBIT 2022
VERTIV v. VALTRUS IPR2025-00667
53 of 214

Reference	In Combination With	Claims
Patel ’104	Arima Baer Feeney Kunin Lancia Matsuo Nakazato ’269 Newton Pearse Sawyer Shimizu I Shimizu II Suzuki DS/3 Operation Manual 2000 ICS Operation Manual RackCooler Brochure	1-9
Pearse	Arima Baer Feeney Kunin Lancia Matsuo Nakazato ’269 Newton Patel ’104 Sawyer Shimizu I Shimizu II Suzuki DS/3 Operation Manual 2000 ICS Operation Manual RackCooler Brochure	1-9

VALTRUS EXHIBIT 2022
VERTIV v. VALTRUS IPR2025-00667
54 of 214

Reference	In Combination With	Claims
Sawyer	Arima Feeney Kunin Lancia Matsuo Nakazato ’269 Newton Patel ’104 Pearse Shimizu I Shimizu II Suzuki DS/3 Operation Manual 2000 ICS Operation Manual RackCooler Brochure	1-9
Shimizu I	Arima Feeney Kunin Lancia Matsuo Nakazato ’269 Newton Patel ’104 Pearse Sawyer Shimizu II Suzuki DS/3 Operation Manual 2000 ICS Operation Manual RackCooler Brochure	1-9

VALTRUS EXHIBIT 2022
VERTIV v. VALTRUS IPR2025-00667
55 of 214

Reference	In Combination With	Claims
Shimizu II	Arima Feeney Kunin Lancia Matsuo Nakazato ’269 Newton Patel ’104 Pearse Sawyer Shimizu I Suzuki DS/3 Operation Manual 2000 ICS Operation Manual RackCooler Brochure	1-9
Suzuki	Arima Feeney Kunin Lancia Matsuo Nakazato ’269 Newton Patel ’104 Pearse Sawyer Shimizu I Shimizu II DS/3 Operation Manual 2000 ICS Operation Manual RackCooler Brochure	1-9

VALTRUS EXHIBIT 2022
VERTIV v. VALTRUS IPR2025-00667
56 of 214

Reference	In Combination With	Claims
DS/3 Operation Manual 2000	Arima Baer Feeney Kunin Lancia Matsuo Nakazato ’269 Newton Patel ’104 Pearse Sawyer Shimizu I Shimizu II Suzuki ICS Operation Manual RackCooler Brochure	1-9
ICS Operation Manual	Arima Baer Feeney Kunin Lancia Matsuo Nakazato ’269 Newton Patel ’104 Pearse Sawyer Shimizu I Shimizu II Suzuki DS/3 Operation Manual 2000 RackCooler Brochure	1-9

VALTRUS EXHIBIT 2022
VERTIV v. VALTRUS IPR2025-00667
57 of 214

Reference	In Combination With	Claims
RackCooler Brochure	Arima Baer Feeney Kunin Lancia Matsuo Nakazato ’269 Newton Patel ’104 Pearse Sawyer Shimizu I Shimizu II Suzuki DS/3 Operation Manual 2000 ICS Operation Manual	1-9
Liebert DataCool System	Arima Baer Feeney Kunin Lancia Matsuo Nakazato ’269 Newton Patel ’104 Pearse Sawyer Shimizu I Shimizu II Suzuki DS/3 Operation Manual 2000 ICS Operation Manual RackCooler Brochure	1-9

VALTRUS EXHIBIT 2022
VERTIV v. VALTRUS IPR2025-00667
58 of 214

Reference	In Combination With	Claims
Liebert Deluxe System/3 Cooling Water System - CW	Arima Baer Feeney Kunin Lancia Matsuo Nakazato ’269 Newton Patel ’104 Pearse Sawyer Shimizu I Shimizu II Suzuki ICS Operation Manual RackCooler Brochure	1-9
Liebert Deluxe System / DX System - DX	Arima Baer Feeney Kunin Lancia Matsuo Nakazato ’269 Newton Patel ’104 Pearse Sawyer Shimizu I Shimizu II Suzuki ICS Operation Manual RackCooler Brochure	1-9

VALTRUS EXHIBIT 2022
VERTIV v. VALTRUS IPR2025-00667
59 of 214

Reference	In Combination With	Claims
Liebert Industrial Cooling Series System	Arima Baer Feeney Kunin Lancia Matsuo Nakazato '269 Newton Patel '104 Pearse Sawyer Shimizu I Shimizu II Suzuki DS/3 Operation Manual 2000 RackCooler Brochure	1-9
Liebert Rack Cooler System	Arima Baer Feeney Kunin Lancia Matsuo Nakazato '269 Newton Patel '104 Pearse Sawyer Shimizu I Shimizu II Suzuki DS/3 Operation Manual 2000 ICS Operation Manual	1-9

C. P.R. 3-3(C) Disclosures for the '179 Patent

The tables below list prior art that anticipates and/or renders obvious one or more of the Asserted Claims. The attached claim charts in Exhibits C-1 *et seq.* demonstrate where each limitation of the claims is found, either expressly or inherently in the larger context of the passage, or rendered obvious by, certain of the references listed below, as understood by a person having

VALTRUS EXHIBIT 2022
VERTIV v. VALTRUS IPR2025-00667
60 of 214

ordinary skill in the art. The following patents, publications, products and/or services are prior art under at least 35 U.S.C. §§ 102(a), (b), and/or (e).

1. Identification of Prior Art for the '179 Patent

Patent References

Chart	Patent Number	Citation	Country of Origin	Issue / Pub. Date
C-1	US2001/0042616	Baer	US	Nov. 22, 2001
C-2	US5410448	Barker	US	April 25, 1995
C-3	US2004/0065097	Bash '097	US	April 8, 2004[4]
C-4	US2002/0149911	Bishop	US	Oct. 17, 2002[5]
C-5	US6672955	Charron	US	Jan. 6, 2004[6]
C-6	US4874127	Collier	US	Oct. 17, 1989
C-7	WO 2003/054454	Darling	PCT	July 3, 2003[7]
C-8	US6019677	Demster	US	Feb. 1, 2000
C-9	US5769315	Drees	US	June 23, 1998
C-10	US6196467	DuShane	US	March 6, 2001
C-11	US5467609	Feeney	US	Nov. 21, 1995
C-12	US5979167	Kochavi	US	Nov. 9, 1999
C-13	US4270362	Lancia	US	June 2, 1981
C-14	US6283380	Nakanishi	US	Sept. 4, 2001
C-15	US5718628	Nakazato	US	Feb. 17, 1998
C-16	US6574104	Patel '104	US	April 10, 2003[8]
C-17	US5317907	Shimizu	US	Jun. 7, 1994
C-18	US6557624	Stahl	US	May 6, 2003[9]
C-19	US4182484	Stanke	US	Jan. 8, 1980

[4] Bash was filed October 3, 2002.
[5] Bishop was filed April 12, 2002.
[6] Charron was filed September 3, 2002.
[7] Darling was filed December 12, 2001.
[8] Patel '104 was filed on October 5, 2001.
[9] Stahl was filed on August 9, 2000.

VALTRUS EXHIBIT 2022
VERTIV v. VALTRUS IPR2025-00667
61 of 214

Publications

Chart	Title	Author / Publisher	Date of Publication
C-20	Liebert Deluxe System/3 Operation and Maintenance Manual, SL-18350 (Revised April 2000) ("DS/3 Operation Manual 2000")	Liebert	2000
C-21	Liebert Industrial Cooling Series Operation and Maintenance Manual, SL-18530 ("ICS Operation Manual")	Liebert	1998
C-22	Liebert SLI-53040	Liebert	1999
C-23	Liebert SL-53100	Liebert	1997
C-24	Computational Fluid Dynamics Modeling of High Compute Density Data Centers to Assure System Inlet Air Specifications ("Patel")	Patel	July 13, 2001

Product Sales, Offer for Sale and/or Public Use or Disclosures

Chart	Description	Entity	Sale / Disclosure Date
C-25	Liebert Deluxe System/3 Cooling Water System - CW	Liebert	April 1983
C-26	Liebert Deluxe System / DX System - DX	Liebert	April 1983
C-27	Liebert Industrial Cooling Series System	Liebert	May 1996

In addition, the below references are prior art to the '179 Patent and relevant to the state of the art, obviousness and the knowledge of a POSITA as of the '179 Patent priority date.

Patent/Publication No.	Country of Origin	Date of Issue/ Publication	Relevant Priority Date	Short Title
5,164,394	JP	June 29, 1993	December 13, 1991	Hanzawa
2,644,228	FR	September 14, 1990	March 13, 1989	Gerber
5,154,666	US	October 13, 1992	September 17, 1990	Wapner
4,732,318	US	March 22, 1988	January 17, 1986	Osheroff
0,914,738	JP	January 17, 1997	June 28, 1995	Ikeda

VALTRUS EXHIBIT 2022
VERTIV v. VALTRUS IPR2025-00667
62 of 214

Patent/Publication No.	Country of Origin	Date of Issue/ Publication	Relevant Priority Date	Short Title
6,374,627	US	April 23, 2002	January 9, 2001	Schumacher
6,318,113	US	November 20, 2001	June 12, 2000	Levy
4,795,088	US	January 3, 1989	June 11, 1987	Kobayashi
4,729,292	US	March 3, 1988	October 29, 1986	Marton
5,980,381	US	November 9, 1999	September 8, 1998	McCormick
6,142,866	US	November 7, 2000	March 18, 1999	Wright
0 741 269	EP	June 11, 1996	April 29, 1996	Hayama
2002-156136	JP	May 31, 2002	November 20, 2000	Inoue
01277155	JP	November 7, 1989	April 28, 1988	Nakao
05243770	JP	September 21, 1993	March 2, 1992	Horimoto
01/86217	WIPO	November 15, 2001	May 7, 2001	Spinazzola
5,345,779	US	September 13, 1994	April 23, 1993	Feeney 779
08105647	JP	April 23, 1996	October 3, 1994	Adachi
5,709,100	US	January 20, 1998	August 29, 1996	Baer
6,554,697	US	April 29, 2003	December 3, 1999	Koplin
6,535,382	US	March 18, 2003	April 12, 2001	Bishop

VALTRUS EXHIBIT 2022
VERTIV v. VALTRUS IPR2025-00667
63 of 214

Title	Author/ Publisher	Date Published	Short Title
Operation of Chilled Water Precision Air Systems White Paper #110	APC	2001	White Paper #110
Trane engineers newsletter: turning air distribution upside down . . . Underfloor Air Distribution	Stanke / Trane	December 17, 2001	Stanke

2. The Asserted Claims of the '179 Patent Would Have Been Obvious

If not anticipated, the Asserted Claims of the '179 patent would have been obvious. In particular, limitations, such as "manipulating said controllable partition in response to said sensed temperature," "varying an output of said cooling device in response to said sensed pressure falling outside of said predetermined pressure range," "determining whether . . . measured pressure falls below or equals a predetermined minimum set point pressure," "receiving temperatures from a movable device at various locations of said data center," "performing a numerical modeling of a temperature distribution and flow characteristics of the data center," "manipulating said cooling device in response to said numerical modeling" and "implementing said numerical modeling to correlate" would have been obvious to a POSITA. For starters, the charted references in C-1 *et seq.* are single reference obviousness references in light of the knowledge of a POSITA. Furthermore, a person having ordinary skill in the art would have been motivated to modify or combine the references discussed in charts C-1 *et seq.* based on the disclosures identified and/or information that would have been generally known to a POSITA with reasonable expectations of success. Rationales and/or motivations for such modifications or combinations include:

- Combining the prior art elements according to known methods would have yielded predictable results.
- Simple substitution of one known limitation for another would have yielded predictable results.

VALTRUS EXHIBIT 2022
VERTIV v. VALTRUS IPR2025-00667
64 of 214

- Use of a known technique to improve similar devices in the same ways.
- Applying a known technique to a known system ready for improvement.
- Choosing from a finite number of identified, predictable solutions, with a reasonable expectation of success.
- Variations based on known work in the field.
- Teachings, suggestions, and/or motivations provided in the references themselves.

In particular, the '179 Patent is directed to system(s) and method(s) for supplying cooling fluid, such as cooled air, to computing racks in data centers. The alleged improvement relates to "providing substantially only that amount of cooling fluid necessary to maintain the racks within normal operating temperatures." *See, e.g.*, '179, 17:5-10. In other words, the '179 Patent seeks to promote cooling system efficiency and reduce operating costs, while ensuring the computing devices are sufficiently and reliably cooled. 2:1-13 (noting it was widely desirable to avoid "incur[ing] greater amounts of operating expenses than may be necessary to sufficiently cool the heat generating components contained in the racks of data centers").

A POSITA would have been motivated by several factors, including:

- The need to reliably deliver sufficient cooling to data center racks in multiple zones.
- The need to promote efficiency by delivering an optimum amount of cooling fluid at an optimum velocity.
- The desire to eliminate "hot spots," or local regions in a data center or equipment rack where the temperature exceeds a desired maximum.
- The conventional practice of estimating a temperature distribution in a room through a simulation tool and controlling flow rates and flow directions of cooled supply air and warm return air via fans, louvers, or vents on the basis of the simulation result.
- A POSITA's knowledge and familiarity with the design and operation of raised floor platforms for supporting computer racks arranged within zones and providing pathways for the delivery of cooled air to regions of the data center and for the return of warm air from the cooled regions.

VALTRUS EXHIBIT 2022
VERTIV v. VALTRUS IPR2025-00667
65 of 214

- A POSITA's knowledge of the use of a thermostat, inclusive of firmware, controllers and temperature sensors, in a well-known manner, including the ability to input a set temperature or temperature range.

- A POSITA's knowledge of a thermostat's feedback loop that compares the detected temperature to the set temperature or temperature range and initiates application of heating or cooling fluid until the detected temperature is brought into range of the set temperature.

- A POSITA's knowledge that prior art and conventional practices directed to heating applications can also be used in cooling applications.

  A POSITA's knowledge that achieving a desired temperature in a zone or region by moving a heating or cooling fluid through an HVAC system is a function of the temperature of the fluid, the flow characteristics of the fluid, and the pressure differential of the fluid across the HVAC system, such that one or more variables may be changed to achieve desired temperature conditions at various locations.

- A POSITA's knowledge that a movable temperature sensor can perform the same functionality as a fixed temperature sensor.

Indeed, as shown below in this section, and in the corresponding claim charts, each of the prior art references recognize the need to achieve these objectives and provide solutions similar to those of the '179 Patent. Further, as provided in the corresponding claim charts, it was widely known to address these objectives by varying the supply of cooling fluid to zones or regions of a data center based on multiple sensor readings in the data center in the manner contemplated by the '179 Patent, including as applied to raised-floor data center arrangements, similar to the arrangement disclosed in the '179 Patent. To the extent there are variations among the references in terms of how they achieve common objectives, such variations represent finite number alternative approaches that a POSITA would have reasonably understood would succeed. All told, the nature of these problems to be solved would have led a POSITA to incorporate any combination of the finite number of solutions disclosed, available and/or otherwise known with predictable results, an exercise involving nothing more than routine optimization of well-understood principles and components of cooling systems.

VALTRUS EXHIBIT 2022
VERTIV v. VALTRUS IPR2025-00667
66 of 214

For example, Baer discloses an "apparatus and method for cooling the air exiting an electronics enclosure" that includes the exemplary elements identified in the corresponding claim chart. Baer, Abstract; Chart C-1. A POSITA would have been motivated to turn to Baer, and/or combine it with references directed to similar objectives, for solutions that "provide more efficient cooling than is available from prior art devices and techniques." Baer, Abstract.

Barker discloses a "parallel air flow system which automatically maintains proper coolant flow" that includes the exemplary elements identified in the corresponding claim chart. Barker, Abstract; Chart C-2. A POSITA would have been motivated to turn to Barker, and/or combine it with references directed to similar objectives, for solutions that promote "overall system reliability" in the related field. Barker, 1:53-2:2.

Bash '097 discloses an improved "cooling system for cooling racks in a data center" that includes the exemplary elements identified in the corresponding claim chart. Bash '097, Abstract; Chart C-3. A POSITA would have been motivated to turn to Bash '097, and/or combine it with references directed to similar objectives, for solutions that "circulate cooling fluid substantially only as needed by the racks," which do so in a "more efficient manner as compared to conventional cooling systems." Bash '097, ¶0069.

Bishop discloses "an apparatus for providing cool air to electronic module cabinets" that includes the exemplary elements identified in the corresponding claim chart. Bishop, Abstract; Chart C-4. A POSITA would have been motivated to turn to Bishop, and/or combine it with references directed to similar objectives, for solutions that solve "the need for a more efficient cool air delivery system for use in critical environments," and in particular, the "need for an air delivery system that can automatically alter air volume to module cabinets based on cabinet and/or component temperature." Bishop, ¶0032.

VALTRUS EXHIBIT 2022
VERTIV v. VALTRUS IPR2025-00667
67 of 214

Charron discloses an "air flow management system for an Internet Data Center" that includes the exemplary elements identified in the corresponding claim chart. Charron, Abstract; Chart C-5. A POSITA would have been motivated to turn to Charron, and/or combine it with references directed to similar objectives, for solutions that "properly control cooling capacity" and "avoid wasting any cooling capacity." Charron, 1:45-2:8.

Collier discloses a climate control apparatus for raised floor data centers that includes the exemplary elements identified in the corresponding claim chart. Collier 1:1-15; Chart C-6. A POSITA would have been motivated to turn to Collier, and/or combine it with references directed to similar objectives, for solutions that incorporate appropriate "controls to effect both generalized and localized control of cooling on an energy-efficient basis." Collier, 2:63-3:4.

Darling discloses "a system for controlling the distribution of air for heating or cooling to different zones in a forced air delivery system" that includes the exemplary elements identified in the corresponding claim chart. Darling, 1:7-9; Chart C-7. A POSITA would have been motivated to turn to Darling, and/or combine it with references directed to similar objectives, for solutions for "controlling the distribution of air through the existing duct system in a home which is able to control temperature on a room by room zone basis and which is relatively inexpensive to operate and install." Darling, 2:32-3:4.

Demster discloses "heating and air conditioning systems and air distribution terminals" that includes the exemplary elements identified in the corresponding claim chart. Demster, 1:5-9; Chart C-8. A POSITA would have been motivated to turn to Demster, and/or combine it with references directed to similar objectives, for solutions that "provide modular terminal designs that are readily adaptable to a wide number of HVAC applications" and "in which components of a terminal are assembled using a number of different components, to thereby provide a plurality of

VALTRUS EXHIBIT 2022
VERTIV v. VALTRUS IPR2025-00667
68 of 214

terminal models that can be incorporated into an economic and efficient HVAC system." Demster, 2:15-30.

Drees discloses "a method and system for minimizing supply air temperature disturbances in multi-zone variable air volume systems" that includes the exemplary elements identified in the corresponding claim chart. Drees, 1:5-9; Chart C-9. A POSITA would have been motivated to turn to Drees, and/or combine it with references directed to similar objectives, for solutions that "minimize[e] supply air temperature disturbances." Drees, 1:54-63.

DuShane discloses wirelessly connected movable temperature sensor devices used in commercial and industrial settings that includes the exemplary elements identified in the corresponding claim chart. DuShane, 1:13-30; Chart C-10. A POSITA would have been motivated to turn to DuShane, and/or combine it with references directed to similar objectives, for solutions relating to "industrial and commercial buildings" comprising "many . . . separate zones of occupation with separate heating or cooling," where temperatures are probed at multiple locations throughout the room. DuShane 2:23-38.

Feeney discloses "a floor supported sub-structure system and module assemblage serving to operationally support computer system components, particularly of the incrementally expandable, rack mounted variety" that includes the exemplary elements identified in the corresponding claim chart. Feeney, 2:26-62; Chart C-11. A POSITA would have been motivated to turn to Feeney, and/or combine it with references directed to similar objectives, for solutions that can accommodate "environmental and power input demands [that] can be achieved on a practical cost basis." Feeney, 2:14-23.

Kochavi discloses a system that provides "conditioned air to a plurality of rooms wherein the temperature of each of the rooms may be controlled independently." Kochavi, 9:13. Disclosed

VALTRUS EXHIBIT 2022
VERTIV v. VALTRUS IPR2025-00667
69 of 214

embodiments include the exemplary elements identified in the corresponding claim chart. Chart C-12. A POSITA would have been motivated to turn to Kochavi, and/or combine it with references directed to similar objectives, for solutions that avoid "inefficient operation." Kochavi, 1:44:50.

Lancia discloses "[t]emperature and humidity electrical/electronic control circuits and apparatus to maintain a room at a constant temperature and humidity" that include the exemplary elements identified in the corresponding claim chart. Lancia, Abstract; Chart C-13. A POSITA would have been motivated to turn to Lancia, and/or combine it with references directed to similar objectives, for a solution "capable of responding to a correspondingly broad range of temperature conditions" while ensuring "energy conservation is enhanced." Lancia, 2:46-51.

Nakanishi discloses "[a]n air conditioning system and an air conditioning method . . . for quickly and effectively controlling the temperature in a room requiring cooling and keeping the room at a uniform temperature." Nakanishi, Abstract. Disclosed embodiments include the exemplary elements identified in the corresponding claim chart. *See* Chart C-14. A POSITA would have been motivated to turn to Nakanishi, and/or combine it with references directed to similar objectives, for solutions capable of "quickly responding to the fluctuation of temperature distribution in a computer room, properly controlling a temperature, and keeping an optimum temperature state." Nakanishi, 1:35-50.

Nakazato discloses "an air conditioning method in which a cooling air is supplied through an air passageway formed below a floor into a forced air-cooling equipment disposed on the floor." Nakazato, 1:6-12. Disclosed embodiments include the exemplary elements identified in the corresponding claim chart. Chart C-15. A POSITA would have been motivated to turn to Nakazato, and/or combine it with references directed to similar objectives, for solutions capable of providing

VALTRUS EXHIBIT 2022
VERTIV v. VALTRUS IPR2025-00667
70 of 214

"an air conditioning method which permits cooling an equipment within a room without fail, while reducing the facility cost and operating cost." Nakazato, 1:50-57.

Patel '104 discloses a cooling system "configured to adjust cooling fluid flow to various racks located throughout a data center based upon the detected or anticipated temperatures at various locations throughout the data center." Patel '104, Abstract. Disclosed embodiments include the exemplary elements identified in the corresponding claim chart. Chart C-16. A POSITA would have been motivated to turn to Patel '104, and/or combine it with references directed to similar objectives, for solutions related to "energy efficient utilization of a cooling system by operating them substantially only as needed," individually varying "cooling fluid supply . . . in accordance with actual or anticipated temperatures of the heat generating components," and substantially lowering "costs associated with operating the cooling system." Patel '104, 2:64-3:13.

Shimizu discloses "a multi-type air-conditioning apparatus having a plurality of air-conditioning units connected to an outdoor unit" that includes the exemplary elements identified in the corresponding claim chart. Shimizu, 1:8-14; Chart C-17. A POSITA would have been motivated to turn to Shimizu, and/or combine it with references directed to similar objectives, for solutions "to set up a comfortable air-conditioned environment with less temperature variation." Shimizu, 1:63-2:3.

Stahl discloses a "method and system . . . for cooling a room having one or more heat generating objects" that includes the exemplary elements identified in the corresponding claim chart. Stahl, Abstract; Chart C-18. A POSITA would have been motivated to turn to Stahl, and/or combine it with references directed to similar objectives, for solutions providing "a cooling system having its cooling characteristics closely tailored to the heating characteristics of the equipment to be cooled." Stahl, 2:1-11.

VALTRUS EXHIBIT 2022
VERTIV v. VALTRUS IPR2025-00667
71 of 214

Stanke discloses a "temperature control . . . for a variable volume air conditioning system" for spaces with multiple zones. Stanke, Abstract. Disclosed embodiments include the exemplary elements identified in the corresponding claim chart. *See* Chart C-19. A POSITA would have been motivated to turn to Stanke, and/or combine it with references directed to similar objectives, for solutions that "limit both the minimum and maximum flow of conditioned air to the zone in order to maintain proper ventilation requirements and prevent drafts or excessive noise within the conditioned zone." Stanke, 1:32-48.

The prior art Liebert Systems identified in charts C-25 – C-27 were widely known data center environmental control systems used throughout the industry. A POSITA would have known of Liebert's solutions and understood their features and improvements to achieve objectives relating to efficiently supplying cooling fluid to computing racks in data centers. Therefore, a POSITA would have been motivated to combine these systems' known features with references directed to similar objectives. Similarly, a POSITA would have been motivated to consult widely available Liebert literature relating to its systems, such as the literature disclosed in charts C-20 – C-23, for similar reasons.

Patel discloses modeling of "air flow and temperature distribution in a data center." Patel, 1. Disclosed embodiments include the exemplary elements identified in the corresponding claim chart. *See* Chart C-24. A POSITA would have been motivated to turn to Patel, and/or combine it with references directed to similar objectives, to better understand "fluid mechanics and heat transfer processes inside the data center," including the identification of "'hot spots' in the room." Patel, 2.

Furthermore, a POSITA would have been motivated to combine with reasonable expectations of success, based on the disclosures identified therein and/or information that would

VALTRUS EXHIBIT 2022
VERTIV v. VALTRUS IPR2025-00667
72 of 214

have been generally known to a POSITA, any of the primary references C-1 *et. seq.* charted above with: (1) any other such C-1 *et seq.* primary reference(s); (2) any reference disclosed in the section above for specific concepts claimed in the patent; (3) any statements made in the intrinsic record of the patent, and/or (4) the knowledge of one of ordinary skill in the art. By way of example and without prejudice to any other combinations of references, Defendants provide the following exemplary combinations, which would obviate the invention of the '179 Patent.

Exemplary Reference Combinations

Reference	In Combination With	Claims
Baer	Barker Bash '097 Bishop Charron Collier Darling Demster Drees DuShane Feeney Kochavi Lancia Nakanishi Nakazato Patel '104 Shimizu Stahl Stanke DS/3 Operation Manual 2000 ICS Operation Manual Liebert SLI-53040 Liebert SL-53100 Patel	1-6, 9-13, 15
Barker	Baer Bash '097 Bishop Charron Collier Darling Demster Drees	1-6, 9-13, 15

VALTRUS EXHIBIT 2022
VERTIV v. VALTRUS IPR2025-00667
73 of 214

Reference	In Combination With	Claims
	DuShane Feeney Kochavi Lancia Nakanishi Nakazato Patel '104 Shimizu Stahl Stanke DS/3 Operation Manual 2000 ICS Operation Manual Liebert SLI-53040 Liebert SL-53100 Patel	
Bash '097	Baer Barker Bishop Charron Collier Darling Demster Drees DuShane Feeney Kochavi Lancia Nakanishi Nakazato Patel '104 Shimizu Stahl Stanke DS/3 Operation Manual 2000 ICS Operation Manual Liebert SLI-53040 Liebert SL-53100 Patel	1-6, 9-13, 15
Bishop	Baer Barker Bash '097 Charron Collier Darling	1-6, 9-13, 15

VALTRUS EXHIBIT 2022
VERTIV v. VALTRUS IPR2025-00667
74 of 214

Reference	In Combination With	Claims
	Demster Drees DuShane Feeney Kochavi Lancia Nakanishi Nakazato Patel '104 Shimizu Stahl Stanke DS/3 Operation Manual 2000 ICS Operation Manual Liebert SLI-53040 Liebert SL-53100 Patel	
Charron	Baer Barker Bash '097 Bishop Collier Darling Demster Drees DuShane Feeney Kochavi Lancia Nakanishi Nakazato Patel '104 Shimizu Stahl Stanke DS/3 Operation Manual 2000 ICS Operation Manual Liebert SLI-53040 Liebert SL-53100 Patel	1-6, 9-13, 15
Collier	Baer Barker Bash '097 Bishop	1-6, 9-13, 15

VALTRUS EXHIBIT 2022
VERTIV v. VALTRUS IPR2025-00667
75 of 214

Reference	In Combination With	Claims
	Charron Darling Demster Drees DuShane Feeney Kochavi Lancia Nakanishi Nakazato Patel '104 Shimizu Stahl Stanke DS/3 Operation Manual 2000 ICS Operation Manual Liebert SLI-53040 Liebert SL-53100 Patel	
Darling	Baer Barker Bash '097 Bishop Charron Collier Demster Drees DuShane Feeney Kochavi Lancia Nakanishi Nakazato Patel '104 Shimizu Stahl Stanke DS/3 Operation Manual 2000 ICS Operation Manual Liebert SLI-53040 Liebert SL-53100 Patel	1-6, 9-13, 15
Demster	Baer Barker	1-6, 9-13, 15

VALTRUS EXHIBIT 2022
VERTIV v. VALTRUS IPR2025-00667
76 of 214

Reference	In Combination With	Claims
	Bash ’097 Bishop Charron Collier Darling Drees DuShane Feeney Kochavi Lancia Nakanishi Nakazato Patel ’104 Shimizu Stahl Stanke DS/3 Operation Manual 2000 ICS Operation Manual Liebert SLI-53040 Liebert SL-53100 Patel	
Drees	Baer Barker Bash Bishop Charron Collier Darling Demster DuShane Feeney Kochavi Lancia Nakanishi Nakazato Patel ’104 Shimizu Stahl Stanke DS/3 Operation Manual 2000 ICS Operation Manual Liebert SLI-53040 Liebert SL-53100 Patel	1-6, 9-13, 15

VALTRUS EXHIBIT 2022
VERTIV v. VALTRUS IPR2025-00667
77 of 214

Reference	In Combination With	Claims
DuShane	Baer Barker Bash '097 Bishop Charron Collier Darling Demster Drees Feeney Kochavi Lancia Nakanishi Nakazato Patel '104 Shimizu Stahl Stanke DS/3 Operation Manual 2000 ICS Operation Manual Liebert SLI-53040 Liebert SL-53100 Patel	1-6, 9-13, 15
Feeney	Baer Barker Bash '097 Bishop Charron Collier Darling Demster Drees DuShane Kochavi Lancia Nakanishi Nakazato Patel '104 Shimizu Stahl Stanke DS/3 Operation Manual 2000 ICS Operation Manual Liebert SLI-53040 Liebert SL-53100	1-6, 9-13, 15

VALTRUS EXHIBIT 2022
VERTIV v. VALTRUS IPR2025-00667
78 of 214

Reference	In Combination With	Claims
	Patel	
Kochavi	Baer Barker Bash '097 Bishop Charron Collier Darling Demster Drees DuShane Feeney Lancia Nakanishi Nakazato Patel '104 Shimizu Stahl Stanke DS/3 Operation Manual 2000 ICS Operation Manual Liebert SLI-53040 Liebert SL-53100 Patel	1-6, 9-13, 15
Lancia	Baer Barker Bash '097 Bishop Charron Collier Darling Demster Drees DuShane Feeney Kochavi Nakanishi Nakazato Patel '104 Shimizu Stahl Stanke DS/3 Operation Manual 2000 ICS Operation Manual	1-6, 9-13, 15

VALTRUS EXHIBIT 2022
VERTIV v. VALTRUS IPR2025-00667
79 of 214

Reference	In Combination With	Claims
	Liebert SLI-53040 Liebert SL-53100 Patel	
Nakanishi	Baer Barker Bash '097 Bishop Charron Collier Darling Demster Drees DuShane Feeney Kochavi Lancia Nakazato Patel '104 Shimizu Stahl Stanke DS/3 Operation Manual 2000 ICS Operation Manual Liebert SLI-53040 Liebert SL-53100 Patel	1-6, 9-13, 15
Nakazato	Baer Barker Bash '097 Bishop Charron Collier Darling Demster Drees DuShane Feeney Kochavi Lancia Nakanishi Patel '104 Shimizu Stahl Stanke	1-6, 9-13, 15

VALTRUS EXHIBIT 2022
VERTIV v. VALTRUS IPR2025-00667
80 of 214

Reference	In Combination With	Claims
	DS/3 Operation Manual 2000 ICS Operation Manual Liebert SLI-53040 Liebert SL-53100 Patel	
Patel ’104	Baer Barker Bash ’097 Bishop Charron Collier Darling Demster Drees DuShane Feeney Kochavi Lancia Nakanishi Nakazato Shimizu Stahl Stanke DS/3 Operation Manual 2000 ICS Operation Manual Liebert SLI-53040 Liebert SL-53100 Patel	1-6, 9-13, 15
Shimizu	Baer Barker Bash ’097 Bishop Charron Collier Darling Demster Drees DuShane Feeney Kochavi Lancia Nakanishi Nakazato Patel ’104	1-6, 9-13, 15

VALTRUS EXHIBIT 2022
VERTIV v. VALTRUS IPR2025-00667
81 of 214

Reference	In Combination With	Claims
	Stahl Stanke DS/3 Operation Manual 2000 ICS Operation Manual Liebert SLI-53040 Liebert SL-53100 Patel	
Stahl	Baer Barker Bash '097 Bishop Charron Collier Darling Demster Drees DuShane Feeney Kochavi Lancia Nakanishi Nakazato Patel '104 Shimizu Stanke DS/3 Operation Manual 2000 ICS Operation Manual Liebert SLI-53040 Liebert SL-53100 Patel	1-6, 9-13, 15
Stanke	Baer Barker Bash '097 Bishop Charron Collier Darling Demster Drees DuShane Feeney Kochavi Lancia Nakanishi	1-6, 9-13, 15

VALTRUS EXHIBIT 2022
VERTIV v. VALTRUS IPR2025-00667
82 of 214

Reference	In Combination With	Claims
	Nakazato Patel '104 Shimizu Stahl DS/3 Operation Manual 2000 ICS Operation Manual Liebert SLI-53040 Liebert SL-53100 Patel	
DS/3 Operation Manual 2000	Baer Barker Bash '097 Bishop Charron Collier Darling Demster Drees DuShane Feeney Kochavi Lancia Nakanishi Nakazato Patel '104 Shimizu Stahl Stanke ICS Operation Manual Liebert SLI-53040 Liebert SL-53100 Patel	1-6, 9-13, 15
ICS Operation Manual	Baer Barker Bash '097 Bishop Charron Collier Darling Demster Drees DuShane Feeney Kochavi	1-6, 9-13, 15

VALTRUS EXHIBIT 2022
VERTIV v. VALTRUS IPR2025-00667
83 of 214

Reference	In Combination With	Claims
	Lancia Nakanishi Nakazato Patel '104 Shimizu Stahl Stanke DS/3 Operation Manual 2000 Liebert SLI-53040 Liebert SL-53100 Patel	
Liebert SLI-53040	Baer Barker Bash '097 Bishop Charron Collier Darling Demster Drees DuShane Feeney Kochavi Lancia Nakanishi Nakazato Patel '104 Shimizu Stahl Stanke DS/3 Operation Manual 2000 ICS Operation Manual Liebert SL-53100 Patel	1-6, 9-13, 15
Liebert SL-53100	Baer Barker Bash '097 Bishop Charron Collier Darling Demster Drees DuShane	1-6, 9-13, 15

VALTRUS EXHIBIT 2022
VERTIV v. VALTRUS IPR2025-00667
84 of 214

Reference	In Combination With	Claims
	Feeney Kochavi Lancia Nakanishi Nakazato Patel '104 Shimizu Stahl Stanke DS/3 Operation Manual 2000 ICS Operation Manual Liebert SLI-53040 Patel	
Patel	Baer Barker Bash '097 Bishop Charron Collier Darling Demster Drees DuShane Feeney Kochavi Lancia Nakanishi Nakazato Patel '104 Shimizu Stahl Stanke DS/3 Operation Manual 2000 ICS Operation Manual Liebert SLI-53040 Liebert SL-53100	1-6, 9-13, 15
Liebert Deluxe System/ 3 Cooling Water System - CW	Baer Barker Bash '097 Bishop Charron Collier Darling Demster	1-6, 9-13, 15

VALTRUS EXHIBIT 2022
VERTIV v. VALTRUS IPR2025-00667
85 of 214

Reference	In Combination With	Claims
	Drees DuShane Feeney Kochavi Lancia Nakanishi Nakazato Patel ’104 Shimizu Stahl Stanke ICS Operation Manual Liebert SLI-53040 Liebert SL-53100 Patel	
Liebert Deluxe System / DX System - DX	Baer Barker Bash ’097 Bishop Charron Collier Darling Demster Drees DuShane Feeney Kochavi Lancia Nakanishi Nakazato Patel ’104 Shimizu Stahl Stanke ICS Operation Manual Liebert SLI-53040 Liebert SL-53100 Patel	1-6, 9-13, 15
Liebert Industrial Cooling Series System	Baer Barker Bash ’097 Bishop Charron Collier	1-6, 9-13, 15

VALTRUS EXHIBIT 2022
VERTIV v. VALTRUS IPR2025-00667
86 of 214

Reference	In Combination With	Claims
	Darling Demster Drees DuShane Feeney Kochavi Lancia Nakanishi Nakazato Patel '104 Shimizu Stahl Stanke DS/3 Operation Manual 2000 Liebert SLI-53040 Liebert SL-53100 Patel	

D. P.R. 3-3(C) Disclosures for the '870 Patent

1. Identification of Prior Art for the '870 Patent

Patent References

Chart	Patent Number	Citation	Country of Origin	Issue / Pub. Date
D-1	US8544289	Johnson	US	Oct. 1, 2013[10]
D-2	US6283380	Nakanishi	US	Sept. 4, 2001
D-3	US5718628	Nakazato	US	Feb. 17, 1998

Publications

Chart	Title	Author / Publisher	Date of Publication
D-4	A Hybrid Methodology For The Optimization Of Data Center Room Layout ("Guggari")	Guggari	July 6, 2003

[10] Johnson is a continuation of U.S. Patent App. No. 10/303,641, which was filed Nov. 25, 2002.

VALTRUS EXHIBIT 2022
VERTIV v. VALTRUS IPR2025-00667
87 of 214

Chart	Title	Author / Publisher	Date of Publication
D-5	Thermal Considerations in Cooling Large Scale High Compute Density Data Centers ("Patel")	Patel	2002
D-6	Multi-Scale Modeling of High Power Density Data Centers ("Rambo")	Rambo	July 6, 2003
D-7	Dimensionless Parameters For Evaluation If Thermal Design And Performance Of Large-Scale Data Centers ("Sharma I")	Sharma	June 24, 2002
D-8	Efficient Thermal Management of Data Centers - Immediate and Long-Term Research Needs ("Sharma II")	Sharma	April 2003

In addition, the below references are prior art to the '870 Patent and relevant to the state of the art, obviousness and the knowledge of a POSITA as of the '870 Patent priority date.

Patent/Publication No.	Country of Origin	Date of Issue/ Publication	Relevant Priority Date	Short Title
2005/0174733	US	August 11, 2005	February 6, 2004	Novotny
2,644,228	FR	September 14, 1990	March 13, 1989	Gerber
2001074290	JP	March 23, 2001	August 31, 1999	Oguro
2002061911	JP	February 28, 2022	August 17, 2000	Kubo
06201175	JP	July 19, 1994	December 28, 1992	Goto
2001/0029163	US	October 11, 2001	February 16, 2001	Spinazzola
2002/0103628	US	August 1, 2002	August 23, 2001	Leslie
2002/0112491	US	August 22, 2002	February 22, 2001	Malone
2002/0157821	US	October 31, 2002	April 30, 2001	Beitelmal
2003/0053293	US	March 20, 2003	September 14, 2001	Beitelmal '293
2003/0147214	US	August 7, 2003	February 5, 2002	Patel
2003/0158718	US	August 21, 2003	February 19, 2002	Nakagawa

VALTRUS EXHIBIT 2022
VERTIV v. VALTRUS IPR2025-00667
88 of 214

Patent/Publication No.	Country of Origin	Date of Issue/ Publication	Relevant Priority Date	Short Title
2003/0200050	US	October 23, 2003	April 17, 2002	Sharma
2003/0221821	US	December 4, 2003	May 31, 2002	Patel
2004/0004813	US	January 8, 2004	June 24, 2003	Coglitore
2004/0008113	US	January 15, 2004	July 9, 2003	Pradhan
2004/0020224	US	February 5, 2004	December 4, 2002	Bash
2004/0020225	US	February 5, 2004	August 2, 2002	Patel
2004/0020226	US	February 5, 2004	December 4, 2002	Bash
2004/0065097	US	April 8, 2004	October 3, 2002	Bash
2004/0072535	US	April 15, 2004	May 27, 2003	Schneider
2005/0038562	US	February 17, 2005	August 13, 2003	Bash
2005/0225936	US	October 13, 2005	March 28, 2003	Day
4,874,127	US	October 17, 1989	November 12, 1987	Collier
5,209,072	US	May 11, 1993	March 18, 1992	Truckenbrod
5,699,287	US	December 16, 1997	October 20, 1995	Muramatsu
6,009,939	US	January 4, 2000	February 26, 1997	Nakanishi
6,283,380	US	September 4, 2001	March 20, 2000	Nakanishi
6,374,627	US	April 23, 2002	January 9, 2001	Schumacher
6,389,582	US	May 14, 2002	December 21, 1995	Valainis
6,405,142	US	June 11, 2002	August 11, 1999	Ogawa
6,676,026	US	January 13, 2004	August 7, 2002	McKinley
4,386,502	US	June 7, 1983	July 6, 1981	Umezu
6,104,003	US	August 15, 2000	October 7, 1999	Jones

VALTRUS EXHIBIT 2022
VERTIV v. VALTRUS IPR2025-00667
89 of 214

Patent/Publication No.	Country of Origin	Date of Issue/ Publication	Relevant Priority Date	Short Title
2005/0122684	US	June 9, 2005	December 3, 2003	Chu
2007/0213000	US	September 13, 2007	March 28, 2003	Day
6,859,366	US	February 22, 2005	March 19, 2003	Fink

Title	Author/ Publisher	Date Published	Short Title
A Hybrid Flow Network-CFD Method for Achieving Any Desired Flow Partitioning Through Floor Tiles of a Raised-Floor Data Center	Vangilder/ ASME	January 2003	Vangilder
The Different Types of Air Conditioning Equipment for IT Environments: White Paper #59	Evans / APC	2004	Evans

2. The Asserted Claims of the '870 Patent Would Have Been Obvious

If not anticipated, the Asserted Claims of the '870 Patent would have been obvious. In particular, limitations, such as "calculating indices of air re-circulation for the one or more heat dissipating devices based upon the detected inlet temperatures, outlet temperatures and supplied air temperatures," "determining whether the indices of air re-circulation has changed in response to the varied flow field settings," "evaluating the one or more components based upon changes in the indices of air re-circulation for the one or more heat dissipating devices at the various flow field settings," "indices of air re-circulation are supply heat indices . . . [defined by the disclosed equation]" would have been obvious to a POSITA. For starters, the charted references in D-1 *et seq.* are single reference obviousness references in light of the knowledge of a POSITA. Furthermore, a person having ordinary skill in the art would have been motivated to modify or combine the references discussed in charts D-1 *et seq.* based on the disclosures identified and/or

VALTRUS EXHIBIT 2022
VERTIV v. VALTRUS IPR2025-00667
90 of 214

information that would have been generally known to a POSITA with reasonable expectations of success. Rationales and/or motivations for such modifications or combinations include:

- Combining the prior art elements according to known methods would have yielded predictable results.
- Simple substitution of one known limitation for another would have yielded predictable results.
- Use of a known technique to improve similar devices in the same ways.
- Applying a known technique to a known system ready for improvement.
- Choosing from a finite number of identified, predictable solutions, with a reasonable expectation of success.
- Variations based on known work in the field.
- Teachings, suggestions, and/or motivations provided in the references themselves.

In particular, the '870 Patent discloses a "method for evaluating one or more components in a data center" in relation to "inlet and outlet temperatures. '870, Abstract. The '870 Patent represents that it improves upon data center "infrastructures that are not efficiently designed for varying heat loads and airflows." *See, e.g.*, *id.*, 2:30-35. Thus, the '870 Patent seeks to promote cooling system efficiency and reduce operating costs, while ensuring the computing devices are sufficiently and reliably cooled. *Id.*, 2:7-12 (noting it was widely desirable to avoid "incur[ing] greater amounts of operating expenses than may be necessary to sufficiently cool the heat generating components contained in the racks of data centers").

A POSITA would have been motivated by several factors, including:

- The need to reliably deliver sufficient cooling to data center racks in multiple zones.
- The need to promote efficiency by delivering an optimum amount of cooling fluid at various regions of a data center.
- The desire to eliminate "hot spots," or local regions in a data center or equipment rack where the temperature exceeds a desired maximum.

VALTRUS EXHIBIT 2022
VERTIV v. VALTRUS IPR2025-00667
91 of 214

- The conventional practice of estimating a temperature distribution in a room through a simulation and controlling flow rates and airflow directions of cooled supply air and warm return air via fans, louvers, or vents on the basis of the simulation result.

- A POSITA's knowledge of the use of temperature sensors in a well-known manner to collect temperature data in relation to optimizing the design and operation of data center cooling systems.

- A POSITA's knowledge and understanding of basic thermodynamic principles and fluid dynamics principles that inform the optimal design and arrangement of data center computing equipment and cooling system components.

- A POSITA's knowledge and experience with conventional CFD modeling and simulation tools for analyzing data center cooling systems and the impact of changes to the design, operational parameters and layout of the data center computing equipment and cooling system components.

- A POSITA's knowledge of making mathematical calculations, such as to compute air re-circulation indices, applying fundamental thermodynamics and fluid dynamics principles for evaluating the components of data center cooling systems and optimizing the design and operations of data center cooling systems to provide more effective and efficient cooling.

Indeed, as shown below in this section, and in the corresponding claim charts, each of the prior art references recognize the need to achieve these objectives and provide solutions similar to those of the '870 Patent. Further, as provided in the corresponding claim charts, it was known to calculate air re-circulation indices in the manner contemplated by the '870 Patent. To the extent there are variations among the references in terms of how they achieve common objectives, such variations represent a finite number of alternative approaches that a POSITA would have reasonably understood would succeed. All told, the nature of these problems to be solved would have led a POSITA to incorporate any combination of the finite number of solutions disclosed, available and/or otherwise known with predictable results, an exercise involving nothing more than routine optimization of well-understood principles and components of cooling systems.

For example, Johnson discloses a "system and method . . . for removal of exhaust air vented from equipment during operation to thereby remove heat from the equipment." Johnson, Abstract.

VALTRUS EXHIBIT 2022
VERTIV v. VALTRUS IPR2025-00667
92 of 214

Disclosed embodiments include the exemplary elements identified in the corresponding claim chart. *See* Chart D-1. A POSITA would have been motivated to turn to Johnson, and/or combine it with references directed to similar objectives, for solutions that "remove exhaust air produced by rack-mounted equipment for efficient and effective cooling of the equipment." Johnson, 5:55-60.

Nakanishi discloses "an air conditioning system and an air conditioning method . . . for quickly and effectively controlling the temperature in a room requiring cooling and keeping the room at a uniform temperature." Nakanishi, Abstract. Disclosed embodiments include the exemplary elements identified in the corresponding claim chart. *See* Chart D-2. A POSITA would have been motivated to turn to Nakanishi, and/or combine it with references directed to similar objectives, for solutions capable of "quickly responding to the fluctuation of temperature distribution in a computer room, properly controlling a temperature, and keeping an optimum temperature state." Nakanishi, 1:35-50.

Nakazato discloses "an air conditioning method in which a cooling air is supplied through an air passageway formed below a floor into a forced air-cooling equipment disposed on the floor." Nakazato, 1:6-12. Disclosed embodiments include the exemplary elements identified in the corresponding claim chart. *See* Chart D-3. A POSITA would have been motivated to turn to Nakazato, and/or combine it with references directed to similar objectives, for solutions capable of providing "an air conditioning method which permits cooling an equipment within a room without fail, while reducing the facility cost and operating cost." Nakazato, 1:50-57.

Guggari discloses methodologies covering "both under floor analysis and above floor analysis to arrive at the best layout possible" and "how flow gets distributed through the racks in order to ensure that rack inlet temperature is within prescribed." Guggari, 2. Disclosed

VALTRUS EXHIBIT 2022
VERTIV v. VALTRUS IPR2025-00667
93 of 214

embodiments include the exemplary elements identified in the corresponding claim chart. *See* Chart D-4. A POSITA would have been motivated to turn to Guggari, and/or combine it with references directed to similar objectives, for solutions "for the optimization of the data center" and "analysis of the room to determine if adequate cooling is provided for the racks." Guggari, 8.

Patel discloses "an overview of a data center cooling design and presents the results of a case study where layout change was made by virtue of numerical modeling to avail efficient use of air conditioning resources." Patel, Abstract. Disclosed embodiments include the exemplary elements identified in the corresponding claim chart. *See* Chart D-5. A POSITA would have been motivated to turn to Patel, and/or combine it with references directed to similar objectives, "to provide energy saving by removing the need for this additional capacity in CRAC units, by CFD modeling and variable capacity air conditioning infrastructure." Patel, 6.

Rambo discloses a "multi-scale approach to modeling flow inside a data center." Rambo, 7. Disclosed embodiments include the exemplary elements identified in the corresponding claim chart. *See* Chart D-6. A POSITA would have been motivated to turn to Rambo, and/or combine it with references directed to similar objectives, for solutions providing a "reliable methodology . . . to make the most efficient use of the cooling capacity supplied by the CRAC units and ultimately reduce the operational cost of data centers." Rambo, 2.[11]

Sharma I discloses "dimensionless, scalable parameters for design and performance evaluation of data centers." Sharma I, 1. Disclosed embodiments include the exemplary elements identified in the corresponding claim chart. *See* Chart D-7. A POSITA would have been motivated to turn to Sharma I, and/or combine it with references directed to similar objectives, for solutions

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[11] Further, Rambo and Johnson were distributed at the same International Electronic Packaging Technical Conference and Exhibition, July 6-11, 2003, Maui, Hawaii, USA.

VALTRUS EXHIBIT 2022
VERTIV v. VALTRUS IPR2025-00667
94 of 214

that "provide an invaluable tool to understand convective heat transfer in large data centers but also suggest means to improve energy efficiency in data centers." Sharma I, 1.

Sharma II discloses "current research trends in data center design and analysis that address the problem of increased power densities in air-cooled environments." Sharma II, 151. Disclosed embodiments include the exemplary elements identified in the corresponding claim chart. *See* Chart D-8. A POSITA would have been motivated to turn to Sharma II, and/or combine it with references directed to similar objectives, for solutions providing "further development of energy-efficient data center air-conditioning equipment that can enable dynamic provisioning of CRACs, and cooling resources in general, to meet the needs of a dynamic environment." *Id*., 139.

Furthermore, a POSITA would have been motivated to combine with reasonable expectations of success, based on the disclosures identified therein and/or information that would have been generally known to a POSITA, any of the primary references D-1 *et. seq.* charted above with: (1) any other such D-1 *et seq.* primary reference(s); (2) any reference disclosed in the section above for specific concepts claimed in the patent; (3) any statements made in the intrinsic record of the patent, and/or (4) the knowledge of one of ordinary skill in the art. By way of example and without prejudice to any other combinations of references, Defendants provide the following exemplary combinations, which would obviate the invention of the '870 Patent.

Exemplary Reference Combinations

Reference	In Combination With	Claims
Johnson	Nakanishi Nakazato Guggari Patel Rambo Sharma I Sharma II	1-2, 6-12

VALTRUS EXHIBIT 2022
VERTIV v. VALTRUS IPR2025-00667
95 of 214

Reference	In Combination With	Claims
Nakanishi	Johnson Nakazato Guggari Patel Rambo Sharma I Sharma II	1-2, 6-12
Nakazato	Johnson Nakanishi Guggari Patel Rambo Sharma I Sharma II	1-2, 6-12
Guggari	Johnson Nakanishi Nakazato Patel Rambo Sharma I Sharma II	1-2, 6-12
Patel	Johnson Nakanishi Nakazato Guggari Rambo Sharma I Sharma II	1-2, 6-12
Rambo	Johnson Nakanishi Nakazato Guggari Patel Sharma I Sharma II	1-2, 6-12
Sharma I	Johnson Nakanishi Nakazato Guggari Patel Rambo Sharma II	1-2, 6-12

VALTRUS EXHIBIT 2022
VERTIV v. VALTRUS IPR2025-00667
96 of 214

Reference	In Combination With	Claims
Sharma II	Johnson Nakanishi Nakazato Guggari Patel Rambo Sharma I	1-2, 6-12

E. P.R. 3-3(C) Disclosures for the '284 Patent

1. Identification of Prior Art for the '284 Patent

Patent References

Chart	Patent Number	Citation	Country of Origin	Issue / Pub. Date
E-1	US5410448	Barker	US	April 25, 1993
E-2	US5863246	Bujak	US	January 26, 1999
E-3	US6672955	Charron	US	January 6, 2004[12]
E-4	US6019677	Demster	US	February 1, 2000
E-5	US5769315	Drees	US	June 23, 1998
E-6	US5979167	Kochavi	US	November 9, 1999
E-7	US6574104	Patel '104	US	June 3, 2003[13]
E-8	JP2002006992A	Takashi	JP	January 11, 2002
E-9	PCT/US2000/018459	Timmerman '459	WO	February 8, 2001
E-10	JPHO513975A	Tomojiro	JP	January 22, 1993

In addition, the below references are prior art to the '284 Patent and relevant to the state of the art, obviousness and the knowledge of a POSITA as of the '284 Patent priority date.

Patent/Publication No.	Country of Origin	Date of Issue/ Publication	Relevant Priority Date	Short Title
6,188,189	US	Feb. 13, 2001	Dec. 23, 1999	Blake

[12] Filed on September 3, 2002.
[13] Published on April 10, 2003, and filed on October 5, 2001.

VALTRUS EXHIBIT 2022
VERTIV v. VALTRUS IPR2025-00667
97 of 214

Patent/Publication No.	Country of Origin	Date of Issue/ Publication	Relevant Priority Date	Short Title
2002/0020682	US	Feb. 11, 2003	June 29, 2001	Broome
4,126,269	US	Nov. 21, 1978	Nov. 21, 1978	Bruges
20020134544	US	Sept. 6, 2002	Sept. 6, 2001	DeVilbiss
6,401,463	US	May 30, 2002	Nov. 29, 2000	Dukhan
5,797,275	US	Aug. 25, 1998	Aug. 25, 1998	Forsman
6,544,309	US	Apr. 8, 2003	Apr. 12. 2000	Hoefer
2002168479A	JP	June 14, 2002	June 14, 2002	Inoue '479
6,539,736	US	Apr. 1, 2003	June 15, 2000	Isazawa
6,127,663	US	October 7, 1999	October 7, 1999	Jones '663
5,826,432	US	Oct. 27, 1998	Oct. 27, 1998	Ledbetter
5,906,315	US	May 25, 1999	May 25, 1999	Lewis
6,885,554	US	Apr. 26, 2005	Dec. 9. 1998	Reeck
6,612,365	US	Sept. 2, 2003	May 6, 2000	Saishu
JP2002122348A	JP	Apr. 26, 2002	Apr. 26, 2002	Shimizu '348
WO200186217	US	Nov. 15, 2001	May 9, 2000	Spinazzola
JPH08-152460A	JP	June 11, 1996	November 29, 1994	Suzuki et al.
2575429B2	JP	Oct. 24, 1996	Oct. 24, 1996	Taira
H10-030836A	JP	Feb. 3, 1998	Feb. 3, 1998	Uekusa

2. The Asserted Claims of the '284 Patent Would Have Been Obvious

If not anticipated, the Asserted Claims of the '284 Patent would have been obvious. In particular, limitations, such as "activating a cooling system and opening a plurality of returns," "sensing a pressure of said cooling fluid in the plenum," "determining whether said sensed pressure

VALTRUS EXHIBIT 2022
VERTIV v. VALTRUS IPR2025-00667
98 of 214

is within a predetermined pressure range," and "varying an intake of said cooling system through the plurality of returns in response to said sensed pressure falling outside of said predetermined pressure range" would have been obvious to a POSITA. For starters, the charted references in E-1 *et seq.* are single reference obviousness references in light of the knowledge of a POSITA. Furthermore, a person having ordinary skill in the art would have been motivated to modify or combine the references discussed in charts E-1 *et seq.* based on the disclosures identified and/or information that would have been generally known to a POSITA with reasonable expectations of success. Rationales and/or motivations for such modifications or combinations include:

- Combining the prior art elements according to known methods would have yielded predictable results.
- Simple substitution of one known limitation for another would have yielded predictable results.
- Use of a known technique to improve similar devices in the same ways.
- Applying a known technique to a known system ready for improvement.
- Choosing from a finite number of identified, predictable solutions, with a reasonable expectation of success.
- Variations based on known work in the field.
- Teachings, suggestions, and/or motivations provided in the references themselves.

In particular, the '284 Patent discloses "a cooling system for cooling racks in a data center, [where] cooling fluid is circulated in the data center by a cooling device having a fan." '284, Abstract. The '284 Patent recognizes the need for efficient cooling of data centers, which requires "modifying the return flow rate of cooling fluid [so that] relatively hot fluid may be removed from the data center while relatively cooler fluid may be allowed to remain." *See, e.g.*, '284, 2:67–3:3. Thus, the '284 Patent seeks to address the need "by substantially controlling the amount of heated

VALTRUS EXHIBIT 2022
VERTIV v. VALTRUS IPR2025-00667
99 of 214

cooling fluid (e.g., heated air, return air, etc.) removed from the general vicinity of the components and the subsystems located in the racks." '284, 4:5–11.

A POSITA would have been motivated by several factors, including:

- The need for efficient cooling in a data center comprising multiple racks with varied cooling needs;
- The need for sensing environmental conditions, such as temperature and air pressure, in specific critical locations within a data center, such as difficult-to-access spots at racks or spots next to high-energy use devices with significant temperature and air pressure gradients;
- The need to efficiently cool computer data centers, including by efficiently cooling zones, regions, sections, or racks within a data center by collecting temperature and air pressure data from data centers so that the computing equipment can be cooled based on actual cooling requirements;
- The need for energy saving when cooling data centers, such as by optimizing removal of heated air from the data center while maintaining cooled, fresher air within the data center;
- The need for sensors that provide continuous or periodic monitoring of environmental conditions within a data center;
- The need for providing a reliable system to monitor environmental parameters within a data center remotely to minimize access into the data center and provide safety failsafe mechanisms to avoid reaching critical conditions in data center due to failure of operations' systems;
- The need for providing discriminate cooling and air flow to components and racks with elevated energy needs based on variable factors, such as usage, proximity to other such components, seasonal changes, etc.;
- A POSITA's knowledge that temperature demands vary across components and racks inside data centers due to a plurality of factors, including component usage, location within data center, and air flow and temperature.
- A POSITA's knowledge that fans and compressors may be variably operated to affect environmental factors within a data center, such as temperature and air flow, and such variable usage will have energy usage impacts.
- A POSITA's knowledge that sensors can be placed in a variety of locations and affixed in those locations in a variety of ways, and that placement of such sensors will affect reading from the sensors based on their relative location to air flow patterns within a building.

VALTRUS EXHIBIT 2022
VERTIV v. VALTRUS IPR2025-00667
100 of 214

- A POSITA's knowledge that vents and other mechanical means, which can be manually or automatically-operated in response to sensed measurements and preset conditions, can be employed, in addition to changes to fan speed, to affect the amount of air flow and air pressure of cooling systems.

Indeed, as shown below in this section, and in the corresponding claim charts, each of the prior art references recognizes the need to achieve these objectives and provide solutions similar to those of the '284 Patent. Further, as provided in the claim charts, cooling systems with adjustable returns to discriminately remove heated air from computer housing centers were well known and methods for doing same were well-known. To the extent there are variations among the references in terms of how they achieve common objectives, such variations represent a finite number of alternative approaches that a POSITA would have reasonably understood would succeed. All told, the nature of these problems to be solved would have led a POSITA to incorporate any combination of the finite number of solutions disclosed, available and/or otherwise known with predictable results, an exercise involving nothing more than routine optimization of well-understood principles and components of cooling systems.

For example, Barker discloses "a system which automatically adjusts coolant flow over the circuitry, regardless of the number of circuit boards installed in an enclosure." Barker, 1:7–11. Disclosed embodiments include the exemplary elements identified in the corresponding claim chart. *See* Chart E-1. A POSITA would have been motivated to turn to Barker, and/or combine it with references directed to similar objectives, for solutions for maintaining "[c]onstant static are pressure" and constant flow across "air flow paths in the system." Barker, 1:14–18.

Bujak discloses a system for controlling the pressure at which conditioned air is provided by actively computing (*i.e.*, comparing) pressure setpoints with measured pressures at locations in a duct system that are upstream of where the conditioned air is provided. Bujak, Abstract. Disclosed embodiments include the exemplary elements identified in the corresponding claim

VALTRUS EXHIBIT 2022
VERTIV v. VALTRUS IPR2025-00667
101 of 214

chart. *See* Chart E-2. A POSITA would have been motivated to turn to Bujak, and/or combine it with references directed to similar objectives, for solutions for "provid[ing] a fan control for a [variable-air-volume] VAV System which does not always require that discharge duct pressure be maintained at an artificially high static pressure set point" and "provid[ing] a fan control which can adjust the fan discharge pressure to an appropriate level dictated by any load condition of the VAV system." Bujak, 1:54–62.

Charron discloses "[a]n air flow management system for an Internet Data Center with rows of cabinets . . . located on an elevated floor . . . [and where f]resh air is supplied through the elevated floor in order to cool the heat generating elements . . .[and t]he volume of fresh air supplied through the elevated floor is controlled by openings whereby the static pressure in each tunnel can be controlled depending upon the heat generated." Charron, Abstract. Disclosed embodiments include the exemplary elements identified in the corresponding claim chart. *See* Chart E-3. A POSITA would have been motivated to turn to Charron, and/or combine it with references directed to similar objectives, for solutions that promote "avoid wasting any cooling capacity" and help with "cooling capacity conflicts between adjacent equipment" where the equipment has different power loads. Charron, 1:66–2:8.

Demster discloses "[m]odular terminals for supplying conditioned air to spaces within buildings . . . [wherein the flexibility in arranging the modular terminal components] permits for selectively altering the flow pattern, quality, volume, and velocity of air introduced into a space [, and that] are controlled in response to selected sensor readings." Demster, Abstract. Disclosed embodiments include the exemplary elements identified in the corresponding claim chart. *See* Chart E-4. A POSITA would have been motivated to turn to Demster, and/or combine it with references directed to similar objectives, for solutions that "are readily adaptable to a wide number

VALTRUS EXHIBIT 2022
VERTIV v. VALTRUS IPR2025-00667
102 of 214

of HVAC applications," (Demster, 2:20-23), and that provide "heating, ventilating, and air conditioning to meet a varying range of conditions in discrete spaces on a building floor, the method comprising means for an occupant of said discrete space to adjust the heating, ventilating, and air conditioning output of the modular boxes" (Demster, 2:44-49).

Drees discloses a system that "minimizes supply air temperature disturbances by controlling zone air dampers through a mapping of zone heat transfer requirements and damper positions." Drees, Abstract. Disclosed embodiments include the exemplary elements identified in the corresponding claim chart. *See* Chart E-5. A POSITA would have been motivated to turn to Drees, and/or combine it with references directed to similar objectives, for solutions that "adjust[] the air flow rate . . . to minimize zone air flow disturbances." Drees, 1:66-2:9.

Kochavi discloses a "central air conditioning system [with] a variable speed air blower assembly operative to force air past" certain system elements and where "the control system is operative to control the speed of operation of the first variable speed air blower at least partially in response to the total heat load in the plurality of enclosures." Kochavi, 2:27–41. Disclosed embodiments include the exemplary elements identified in the corresponding claim chart. *See* Chart E-6. A POSITA would have been motivated to turn to Kochavi, and/or combine it with references directed to similar objectives, for solutions that avoid the "operation of a compressor at reduced speeds [that] results in inefficient operation of the compressor as well as require[e] an expensive speed controller for controlling the speed of the electric motor which drives the compressor" in response to sensed parameters, such as "pressure in the main air duct." Kochavi, 1:36–51.

Patel '104 discloses "a smart cooling system for cooling racks in a data center [that] includes a cooling device for supplying cooling fluid to the racks[, which] includes a variable

VALTRUS EXHIBIT 2022
VERTIV v. VALTRUS IPR2025-00667
103 of 214

output fan and a variable capacity compressor[,a plenum having an inlet and a plurality of outlets, in which the inlet of the plenum is in fluid communication with the fan[and a] plurality of vents for delivering the cooling fluid to the racks[,wherein t]he vents are operable to vary a characteristic of the cooling fluid delivered through each of the vents." Patel '104, 2:15–26. Disclosed embodiments include the exemplary elements identified in the corresponding claim chart. *See* Chart E-7. A POSITA would have been motivated to turn to Patel '104, and/or combine it with references directed to similar objectives, for solutions that provide, among others, "substantially focalized supply of cooling fluid to individual racks" and energy efficient usage of the system by operating the system substantially only as needed." Patel '104, 2:67-3:9.

Takashi discloses "an underfloor air-conditioning system for sending cold air to the inside of a computer installed on the floor to cool the computer, a cooling method for the computer, and a recording medium recording a cooling control program." Takashi, [0001]. Disclosed embodiments include the exemplary elements identified in the corresponding claim chart. *See* Chart E-8. A POSITA would have been motivated to turn to Takashi, and/or combine it with references directed to similar objectives, for solutions to changes in flow rates of conditioned cold air being sent to computer installations, differentiating amount of conditioned cold air being sent to individual computers, and measuring and determining whether the cooling air being sent to the computer is being properly sent. *See* Takashi, [0005]–[0007].

Timmerman '459 discloses "a modular cooling system for conditioning air while utilizing an existing chilled water supply and source of water for humidification[that] is particularly useful in connection with large computer installations which require a continuous or near-continuous supply of conditioned air for reliable operation." Timmerman '459, 1:7–15. Disclosed embodiments include the exemplary elements identified in the corresponding claim chart. *See*

VALTRUS EXHIBIT 2022
VERTIV v. VALTRUS IPR2025-00667
104 of 214

Chart E-9. A POSITA would have been motivated to turn to Timmerman ’459, and/or combine it with references directed to similar objectives, for solutions for “producing a supply of conditioned air[14] for humidity and pressure control” and “producing a supply of conditioned air to facilities external to a modular air handling system.” Timmerman ’459, 3:24–4:15.

Tomojiro discloses a forced-air-type cooling system for providing cooling air to heat-generating equipment that is typically operation unattended over long periods of time and in hard-to-reach locations.” Tomojiro, [0001], [0003]. Disclosed embodiments include the exemplary elements identified in the corresponding claim chart. *See* Chart E-10. A POSITA would have been motivated to turn to Tomojiro and/or combine it with references directed to similar objectives, for solutions to consistently provide clean air to such remote, heat-generating devices despite changes in environmental conditions and to compensate for reductions in the cooling capacity to the device by the forced air system.” Tomojiro, [0005]–[0007].

Furthermore, a POSITA would have been motivated to combine with reasonable expectations of success, based on the disclosures identified therein and/or information that would have been generally known to a POSITA, any of the primary references E-1 *et. seq.* charted above with: (1) any other such E-1 *et seq.* primary reference(s); (2) any reference disclosed in the section above for specific concepts claimed in the patent; (3) any statements made in the intrinsic record of the patent, and/or (4) the knowledge of one of ordinary skill in the art. By way of example and without prejudice to any other combinations of references, Defendants provide the following exemplary combinations, which would obviate the invention of the ‘284 Patent.

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[14] Timmerman defines conditioned air as “a supply of air that has been modified such that the volume, temperature, humidity, and purity of the air is within acceptable limits for the facilities, space, or equipment that is being serviced by an air handling system.” Timmerman, 2:13–18.

VALTRUS EXHIBIT 2022
VERTIV v. VALTRUS IPR2025-00667
105 of 214

Exemplary Reference Combinations

Reference	In Combination With	Claims
Barker	Bujak Charron Demster Drees Kochavi Patel '104 Takashi Timmerman '459 Tomojiro	10-13, 16-17
Bujak	Barker Charron Demster Drees Kochavi Patel '104 Takashi Timmerman '459 Tomojiro	10-13, 16-17
Charron	Barker Bujak Demster Drees Kochavi Patel '104 Takashi Timmerman '459 Tomojiro	10-13, 16-17
Demster	Barker Bujak Charron Drees Kochavi Patel '104 Takashi Timmerman '459 Tomojiro	10-13, 16-17

VALTRUS EXHIBIT 2022
VERTIV v. VALTRUS IPR2025-00667
106 of 214

Reference	In Combination With	Claims
Drees	Barker Bujak Charron Demster Kochavi Patel '104 Takashi Timmerman '459 Tomojiro	10-13, 16-17
Kochavi	Barker Bujak Charron Demster Drees Patel '104 Takashi Timmerman '459 Tomojiro	10-13, 16-17
Patel	Barker Bujak Charron Demster Drees Kochavi Takashi Timmerman '459 Tomojiro	10-13, 16-17
Takashi	Barker Bujak Charron Demster Drees Kochavi Patel '104 Timmerman '459 Tomojiro	10-13, 16-17

VALTRUS EXHIBIT 2022
VERTIV v. VALTRUS IPR2025-00667
107 of 214

Reference	In Combination With	Claims
Timmerman '459	Barker Bujak Charron Demster Drees Kochavi Patel '104 Takashi Tomojiro	10-13, 16-17
Tomojiro	Barker Bujak Charron Demster Drees Kochavi Patel '104 Takashi Timmerman '459	10-13, 16-17

F. P.R. 3-3(C) Disclosures for the '683 Patent

The tables below list prior art that anticipates and/or renders obvious one or more of the Asserted Claims. The attached claim charts in Exhibits F-1 *et. seq.* demonstrate where each limitation of the claims is found, either expressly or inherently in the larger context of the passage, or rendered obvious by, certain of the references listed below, as understood by a person having ordinary skill in the art. The following patents, publications, products and/or services are prior art under at least 35 U.S.C. §§ 102(a), (b), and/or (e).

1. Identification of Prior Art for the '683 Patent

Chart	Patent / Publication No.	Citation	Country of Origin	Issue / Pub. Date
F-1	US2001/0042616	Baer	US	Nov. 22, 2001
F-2	US2002/0149911	Bishop	US	Oct. 17, 2002[15]

[15] Bishop was filed April 12, 2002.

VALTRUS EXHIBIT 2022
VERTIV v. VALTRUS IPR2025-00667
108 of 214

Chart	Patent / Publication No.	Citation	Country of Origin	Issue / Pub. Date
F-3	US6672955	Charron	US	Jan. 6, 2004[16]
F-4	US4874127	Collier	US	Oct. 17, 1989
F-5	JPH05-13975A	Kobashi	JP	Jan. 22, 1993
F-6	US5979167	Kochavi	US	Nov. 9, 1999
F-7	US6283380	Nakanishi	US	Sept. 4, 2001
F-8	US5718628	Nakazato	US	Feb. 17, 1998
F-9	US6574104	Patel '104	US	April 10, 2003[17]
F-10	US4259847	Pearse	US	Apr. 7, 1981
F-11	US6557624	Stahl	US	May 6, 2003[18]
F-12	JPH08152460A	Suzuki et al.	JP	June 11, 1996

Publications

Chart	Title	Author / Publisher	Date Published
F-13	SuperVision for Windows V2.6A User Guide ("SuperVision User's Guide")	Automated Logic Corporation	Nov. 10, 1998
F-14	WebCTRL Installation Guide (2000)	Automated Logic Corporation	2000
F-15	SuperVision Plus User's Guide	Automated Logic Corporation	2000

Product Sales, Offers for Sale, and/or Public Use or Disclosures

Chart	Description	Entity	Sale / Disclosure Date
F-16	SuperVision for Windows V2.6A	Automated Logic Corporation	January 2001 (and earlier)
F-17	WebCTRL System	Automated Logic Corporation	2000
F-18	SuperVision Plus System	Automated Logic Corporation	2000
F-19	Liebert Deluxe System/3 Cooling Water System - CW	Liebert	April 1983

In addition, the below references are prior art to the '683 Patent and relevant to the state of the art, obviousness, and the knowledge of a POSITA as of the '683 Patent priority date.

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[16] Charron was filed September 3, 2002.
[17] Patel '104 was filed on October 5, 2001.
[18] Stahl was filed on August 9, 2000.

VALTRUS EXHIBIT 2022
VERTIV v. VALTRUS IPR2025-00667
109 of 214

Patent/Publication No.	Country of Origin	Date of Issue/ Publication	Relevant Priority Date	Short Title
WO200186217	US	Nov. 15, 2001	May 9, 2000	Spinazzola
2002/0134544	US	Sept. 6, 2002	Sept. 6, 2001	DeVilbiss
6,885,554	US	Apr. 26, 2005	Dec. 9. 1998	Reeck
6,612,365	US	Sept. 2, 2003	May 6, 2000	Saishu
6,544,309	US	Apr. 8, 2003	Apr. 12. 2000	Hoefer
6,539,736	US	Apr. 1, 2003	June 15, 2000	Isazawa
6,188,189	US	Feb. 13, 2001	Dec. 23, 1999	Blake
5,410,448	US	Apr. 25, 1995	August 10, 1993	Barker, III
2002006992A	JP	Aug. 24, 2005	Jan. 11, 2002	Ishida
H10-030836A	JP	Feb. 3, 1998	Feb. 3, 1998	Uekusa
2575429B2	JP	Oct. 24, 1996	Oct. 24, 1996	Taira
2002/0020682	US	Feb. 11, 2003	June 29, 2001	Broome
6,401,463	US	May 30, 2002	Nov. 29, 2000	Dukhan
5,906,315	US	May 25, 1999	May 25, 1999	Lewis
5,826,432	US	Oct. 27, 1998	Oct. 27, 1998	Ledbetter
5,797,275	US	Aug. 25, 1998	Aug. 25, 1998	Forsman
4,126,269	US	Nov. 21, 1978	Nov. 21, 1978	Bruges
2002168479A	JP	June 14, 2002	June 14, 2002	Inoue ’479
2002122348A	JP	Apr. 26, 2002	Apr. 26, 2002	Shimizu ’348
5,345,779	US	Sept. 13, 1994	Apr. 23, 1993	Feeney ’779
5,467,609	US	Nov. 21, 1995	Apr. 23, 1993	Feeney ’609
6,374,267	US	Apr. 16, 2002	Aug. 13, 1999	Tam

VALTRUS EXHIBIT 2022
VERTIV v. VALTRUS IPR2025-00667
110 of 214

Patent/Publication No.	Country of Origin	Date of Issue/ Publication	Relevant Priority Date	Short Title
6,412,292	US	July 2, 2002	May 9, 2000	Spinazzola '292
6,557,357	US	May 6, 2003	Feb. 18, 2000	Spinazzola '357
6,494,050	US	Dec. 17. 2002	Feb. 18, 2000	Spinazzola '050
6,574,970	US	June 10, 2003	Feb. 18, 2000	Spinazzola '970
2004/0100770	US	May 27, 2004	Nov. 2, 2002	Chu
5,164,394	JP	June 29, 1993	December 13, 1991	Hanzawa
2,644,228	FR	September 14, 1990	March 13, 1989	Gerber
5,154,666	US	October 13, 1992	September 17, 1990	Wapner
4,732,318	US	March 22, 1988	January 17, 1986	Osheroff
0,914,738	JP	January 17, 1997	June 28, 1995	Ikeda
6,374,627	US	April 23, 2002	January 9, 2001	Schumacher
6,318,113	US	November 20, 2001	June 12, 2000	Levy
4,795,088	US	January 3, 1989	June 11, 1987	Kobayashi
4,729,292	US	March 3, 1988	October 29, 1986	Marton
5,980,381	US	November 9, 1999	September 8, 1998	McCormick
6,142,866	US	November 7, 2000	March 18, 1999	Wright
0 741 269	EP	June 11, 1996	April 29, 1996	Hayama
2002-156136	JP	May 31, 2002	November 20, 2000	Inoue
01277155	JP	November 7, 1989	April 28, 1988	Nakao

VALTRUS EXHIBIT 2022
VERTIV v. VALTRUS IPR2025-00667
111 of 214

Patent/Publication No.	Country of Origin	Date of Issue/ Publication	Relevant Priority Date	Short Title
05243770	JP	September 21, 1993	March 2, 1992	Horimoto
01/86217	WIPO	November 15, 2001	May 7, 2001	Spinazzola
5,345,779	US	September 13, 1994	April 23, 1993	Feeney 779
08105647	JP	April 23, 1996	October 3, 1994	Adachi
5,709,100	US	January 20, 1998	August 29, 1996	Baer
6,554,697	US	April 29, 2003	December 3, 1999	Koplin
6,535,382	US	March 18, 2003	April 12, 2001	Bishop

Title	Author/ Publisher	Date Published	Short Title
Operation of Chilled Water Precision Air Systems White Paper #110	APC	2001	White Paper #110
Trane engineers newsletter: turning air distribution upside down . . . Underfloor Air Distribution	Stanke / Trane	December 17, 2001	Stanke

2. The Asserted Claims of the '683 Patent Would Have Been Obvious

If not anticipated, the Asserted Claims of the '683 Patent would have been obvious. In particular, limitations, such as "activating a cooling system and opening a plurality of returns, said returns being configured to remove cooling fluid from various locations of [a] data center," "supplying cooling fluid to various locations of the data center", "sensing the temperatures of … [datacenter] racks," "determining whether ... sensed temperatures are within a predetermined temperature range," "varying said removal of said cooling fluid from said racks in response to said sensed temperatures being outside said predetermined temperature range," "varying the supply of

VALTRUS EXHIBIT 2022
VERTIV v. VALTRUS IPR2025-00667
112 of 214

cooling fluid in response to varying said removal of said cooling fluid," "decreasing the supply of said cooling fluid to said racks in response to a decrease in the removal of said cooling fluid," "wherein at least one of said supply of cooling fluid and said return of cooling fluid is varied in response to one or more of cooling fluid flow, temperature, and pressure being outside a predetermined range," "varying said removal of said cooling fluid from said racks comprises varying at least one of volume flow rate, velocity and direction of cooling fluid removal," and "increasing the supply of said cooling fluid to said racks in response to an increase in the removal of said cooling fluid," would have been obvious to a POSITA. For starters, the charted references in F-1 *et seq.* are single reference obviousness references in light of the knowledge of a POSITA. Further, a person having ordinary skill in the art would have been motivated to modify or combine the references discussed in charts F-1, *et seq.* based on the disclosures identified and/or information that would have been generally known to a POSITA with reasonable expectations of success, including but not limited to the references cited above in relation to the state of the art. Rationales and/or motivations for such modifications or combinations include:

- Combining the prior art elements according to known methods would have yielded predictable results.
- Simple substitution of one known limitation for another would have yielded predictable results.
- Use of a known technique to improve similar devices in the same ways.
- Applying a known technique to a known system ready for improvement.
- Choosing from a finite number of identified, predictable solutions, with a reasonable expectation of success.
- Variations based on known work in the field.

VALTRUS EXHIBIT 2022
VERTIV v. VALTRUS IPR2025-00667
113 of 214

- Teachings, suggestions, and/or motivations provided in the references themselves.

In particular, the ’683 Patent is directed to system(s) and method(s) for supplying cooling fluid, such as cooled air, to computing racks in data centers. The alleged improvement relates to “operating the cooling system to circulate cooling fluid substantially only as needed by the racks, [so that] the cooling system may be operated at a relatively more efficient manner as compared to conventional cooling systems.” *See, e.g.*, ‘683, 17:12-20. In other words, the ‘683 Patent seeks to promote cooling system efficiency and reduce operating costs, while ensuring the computing devices are sufficiently and reliably cooled. *Id.*; *see also* 2:6-14.

A POSITA would have been motivated by several factors, including:

- The need to reliably deliver sufficient cooling to data center racks in multiple zones.
- The need to promote efficiency by delivering an optimum amount of cooling fluid and removing fluid from racks at an optimum velocity.
- The desire to eliminate “hot spots,” or local regions in a data center or equipment rack where the temperature exceeds a desired maximum.
- The conventional practice of estimating a temperature distribution in a room through a simulation tool and controlling flow rates and flow directions of cooled supply air and warm return air via fans, louvers, or vents on the basis of the simulation result.
- A POSITA’s knowledge and familiarity with the design and operation of raised floor platforms for supporting computer racks arranged within zones and providing pathways for the delivery of cooled air to regions of the data center and for the return of warm air from the cooled regions.

VALTRUS EXHIBIT 2022
VERTIV v. VALTRUS IPR2025-00667
114 of 214

- A POSITA's knowledge of the use of a thermostat, inclusive of firmware, controllers and temperature sensors, in a well-known manner, including the ability to input a set temperature or temperature range.
- A POSITA's knowledge of a thermostat's feedback loop that compares the detected temperature to the set temperature or temperature range and initiates application of heating or cooling fluid until the detected temperature is brought into range of the set temperature.
- A POSITA's knowledge that prior art and conventional practices directed to heating applications can also be used in cooling applications. A POSITA's knowledge that achieving a desired temperature in a zone or region by moving a heating or cooling fluid through an HVAC system is a function of the temperature of the fluid, the flow characteristics of the fluid, and the pressure differential of the fluid across the HVAC system, such that one or more variables may be changed to achieve desired temperature conditions at various locations.
- A POSITA's knowledge that a movable temperature sensor can perform the same functionality as a fixed temperature sensor.

Indeed, as shown below in this section, and in the corresponding claim charts, each of the prior art references recognize the need to achieve these objectives and provide solutions, including the use of adjusting multiple cooling agents based on sensory data, similar to those of the '683 Patent. To the extent there are variations among the references in terms of how they achieve common objectives, such variations represent finite number alternative approaches that a POSITA would have reasonably understood would succeed. All told, the nature of these problems to be solved would have led a POSITA to incorporate any combination of the finite number of solutions

VALTRUS EXHIBIT 2022
VERTIV v. VALTRUS IPR2025-00667
115 of 214

disclosed, available and/or otherwise known with predictable results, an exercise involving nothing more than routine optimization of well-understood principles and components of cooling systems.

For example, Baer discloses an "apparatus and method for cooling the air exiting an electronics enclosure" that includes the exemplary elements identified in the corresponding claim chart. Baer, Abstract; Chart F-1. A POSITA would have been motivated to turn to Baer, and/or combine it with references directed to similar objectives, for solutions that "provide more efficient cooling than is available from prior art devices and techniques." Baer, Abstract.

Bishop discloses "an apparatus for providing cool air to electronic module cabinets" that includes the exemplary elements identified in the corresponding claim chart. Bishop, Abstract; Chart F-2. A POSITA would have been motivated to turn to Bishop, and/or combine it with references directed to similar objectives, for solutions that solve "the need for a more efficient cool air delivery system for use in critical environments," and in particular, the "need for an air delivery system that can automatically alter air volume to module cabinets based on cabinet and/or component temperature." Bishop, ¶0032.

Charron discloses an "air flow management system for an Internet Data Center" that includes the exemplary elements identified in the corresponding claim chart. Charron, Abstract; Chart F-3. A POSITA would have been motivated to turn to Charron, and/or combine it with references directed to similar objectives, for solutions that "properly control cooling capacity" and "avoid wasting any cooling capacity." Charron, 1:45-2:8.

Collier discloses a climate control apparatus for raised floor data centers that includes the exemplary elements identified in the corresponding claim chart. Collier 1:1-15; Chart F-4. A POSITA would have been motivated to turn to Collier, and/or combine it with references directed

VALTRUS EXHIBIT 2022
VERTIV v. VALTRUS IPR2025-00667
116 of 214

to similar objectives, for solutions that incorporate appropriate "controls to effect both generalized and localized control of cooling on an energy-efficient basis." Collier, 2:63-3:4.

Kobashi discloses "an improved cooling device which provides … desired air cooling by forcibly blowing cooling air onto equipment having a heat source" that includes the exemplary elements identified in the corresponding claim chart. Kobashi, [0001]; Chart F-5. A POSITA would have been motivated to turn to Kobashi, and/or combine it with references directed to similar objectives, for solutions that "provide an appropriate cooling device for … heat generating equipment." Kobashi, [0002].

Kochavi discloses a system that provides "conditioned air to a plurality of rooms wherein the temperature of each of the rooms may be controlled independently." Kochavi, 9:13. Disclosed embodiments include the exemplary elements identified in the corresponding claim chart. Chart F-6. A POSITA would have been motivated to turn to Kochavi, and/or combine it with references directed to similar objectives, for solutions that avoid "inefficient operation." Kochavi, 1:44:50.

Nakanishi discloses "[a]n air conditioning system and an air conditioning method . . . for quickly and effectively controlling the temperature in a room requiring cooling and keeping the room at a uniform temperature." Nakanishi, Abstract. Disclosed embodiments include the exemplary elements identified in the corresponding claim chart. See Chart F-7. A POSITA would have been motivated to turn to Nakanishi, and/or combine it with references directed to similar objectives, for solutions capable of "quickly responding to the fluctuation of temperature distribution in a computer room, properly controlling a temperature, and keeping an optimum temperature state." Nakanishi, 1:35-50.

Nakazato discloses "an air conditioning method in which a cooling air is supplied through an air passageway formed below a floor into a forced air-cooling equipment disposed on the floor."

VALTRUS EXHIBIT 2022
VERTIV v. VALTRUS IPR2025-00667
117 of 214

Nakazato, 1:6-12. Disclosed embodiments include the exemplary elements identified in the corresponding claim chart. Chart F-8. A POSITA would have been motivated to turn to Nakazato, and/or combine it with references directed to similar objectives, for solutions capable of providing "an air conditioning method which permits cooling an equipment within a room without fail, while reducing the facility cost and operating cost." Nakazato, 1:50-57.

Patel '104 discloses a cooling system "configured to adjust cooling fluid flow to various racks located throughout a data center based upon the detected or anticipated temperatures at various locations throughout the data center." Patel '104, Abstract. Disclosed embodiments include the exemplary elements identified in the corresponding claim chart. Chart F-9. A POSITA would have been motivated to turn to Patel '104, and/or combine it with references directed to similar objectives, for solutions related to "energy efficient utilization of a cooling system by operating them substantially only as needed," individually varying "cooling fluid supply . . . in accordance with actual or anticipated temperatures of the heat generating components," and substantially lowering "costs associated with operating the cooling system." Patel '104, 2:64-3:13.

Pearse discloses a "an air conditioning system is disclosed in which the air conditioning capacity is stepped to a lower level upon reduced sensible air conditioning demand" for spaces with multiple zones. Pearse, Abstract. Disclosed embodiments include the exemplary elements identified in the corresponding claim chart. See Chart F-10. A POSITA would have been motivated to turn to Pearse, and/or combine it with references directed to similar objectives, for solutions that provide "an air conditioning system with improved energy efficiency by operating the blower at reduced capacity" leading to "reduced operating costs and energy consumption." Pearse, 1:42-54.

Stahl discloses a "method and system . . . for cooling a room having one or more heat generating objects" that includes the exemplary elements identified in the corresponding claim

VALTRUS EXHIBIT 2022
VERTIV v. VALTRUS IPR2025-00667
118 of 214

chart. Stahl, Abstract; Chart F-11. A POSITA would have been motivated to turn to Stahl, and/or combine it with references directed to similar objectives, for solutions providing "a cooling system having its cooling characteristics closely tailored to the heating characteristics of the equipment to be cooled." Stahl, 2:1-11.

Suzuki et al. discloses a "heat exhaust cooling structure" for heat-producing technical equipment located in temperature-controlled rooms with multiple zones, that includes the exemplary elements identified in the corresponding claim chart. Suzuki et al, [0042]; Chart F-12. A POSITA would have been motivated to turn to Suzuki et al., and/or combine it with references directed to similar objectives, for solutions that "improve[] the efficiency of heat exhaust processing by adjusting the exhaust air volume." Suzuki et al., [0042].

The prior art Automated Logic Corporation SuperVision, WebCTRL, and SuperVision Plus user guides and systems identified in charts F-16, F-17, and F-18, as well as the Liebert system identified in F-18, were widely known data center environmental control system used throughout the industry. A POSITA would have known of Automated Logic's and Liebert's solutions and understood their features and improvements to achieve objectives relating to efficiently supplying cooling fluid to computing racks in data centers. Therefore, a POSITA would have been motivated to combine these systems' known features with references directed to similar objectives. Similarly, a POSITA would have been motivated to consult widely available Automated Logic literature relating to its systems, such as the literature disclosed in charts F-13, F-14, and F-15, for similar reasons.

Furthermore, a POSITA would have been motivated to combine with reasonable expectations of success, based on the disclosures identified therein and/or information that would have been generally known to a POSITA, any of the primary references F-1 *et. seq.* charted above

VALTRUS EXHIBIT 2022
VERTIV v. VALTRUS IPR2025-00667
119 of 214

with: (1) any other such F-1 *et seq.* primary reference(s); (2) any reference disclosed in the section above for specific concepts claimed in the patent; (3) any statements made in the intrinsic record of the '683 Patent, and/or (4) the knowledge of one of ordinary skill in the art, including without limitation the common general knowledge in the field as reflected by the art at the time of the alleged invention. By way of example and without prejudice to any other combinations of references, Defendants provide the following exemplary combinations, which would obviate the invention of the '683 Patent.

Exemplary Reference Combinations

Reference	In Combination With	Claims
Baer	Bishop Charron Collier Kobashi Kochavi Nakanishi Nakazato Patel '104 Pearse Stahl Suzuki et al. SuperVision User's Guide WebCTRL Installation Guide (2000) SuperVision Plus User's Guide	10-13, 15
Bishop	Baer Charron Collier Kobashi Kochavi Nakanishi Nakazato Patel '104 Pearse Stahl Suzuki et al. SuperVision User's Guide WebCTRL Installation Guide (2000) SuperVision Plus User's Guide	10-13, 15

VALTRUS EXHIBIT 2022
VERTIV v. VALTRUS IPR2025-00667
120 of 214

Reference	In Combination With	Claims
Charron	Baer Bishop Collier Kobashi Kochavi Nakanishi Nakazato Patel '104 Pearse Stahl Suzuki et al. SuperVision User's Guide WebCTRL Installation Guide (2000) SuperVision Plus User's Guide	10-13, 15
Collier	Baer Bishop Charron Kobashi Kochavi Nakanishi Nakazato Patel '104 Pearse Stahl Suzuki et al. SuperVision User's Guide WebCTRL Installation Guide (2000) SuperVision Plus User's Guide	10-13, 15
Kobashi	Baer Bishop Charron Collier Kochavi Nakanishi Nakazato Patel '104 Pearse Stahl Suzuki et al. SuperVision User's Guide WebCTRL Installation Guide (2000) SuperVision Plus User's Guide	10-13, 15
Kochavi	Baer Bishop	10-13, 15

VALTRUS EXHIBIT 2022
VERTIV v. VALTRUS IPR2025-00667
121 of 214

Reference	In Combination With	Claims
	Charron Collier Kobashi Nakanishi Nakazato Patel '104 Pearse Stahl Suzuki et al. SuperVision User's Guide WebCTRL Installation Guide (2000) SuperVision Plus User's Guide	
Nakanishi	Baer Bishop Charron Collier Kobashi Kochavi Nakazato Patel '104 Pearse Stahl Suzuki et al. SuperVision User's Guide WebCTRL Installation Guide (2000) SuperVision Plus User's Guide	10-13, 15
Nakazato	Baer Bishop Charron Collier Kobashi Kochavi Nakanishi Patel '104 Pearse Stahl Suzuki et al. SuperVision User's Guide WebCTRL Installation Guide (2000) SuperVision Plus User's Guide	10-13, 15
Patel '104	Baer Bishop Charron Collier	10-13, 15

VALTRUS EXHIBIT 2022
VERTIV v. VALTRUS IPR2025-00667
122 of 214

Reference	In Combination With	Claims
	Kobashi Kochavi Nakanishi Nakazato Pearse Stahl Suzuki et al. SuperVision User's Guide WebCTRL Installation Guide (2000) SuperVision Plus User's Guide	
Pearse	Baer Bishop Charron Collier Kobashi Kochavi Nakanishi Nakazato Patel '104 Stahl Suzuki et al. SuperVision User's Guide WebCTRL Installation Guide (2000) SuperVision Plus User's Guide	10-13, 15
Stahl	Baer Bishop Charron Collier Kobashi Kochavi Nakanishi Nakazato Patel '104 Pearse Suzuki et al. SuperVision User's Guide WebCTRL Installation Guide (2000) SuperVision Plus User's Guide	10-13, 15
Suzuki et al.	Baer Bishop Charron Collier Kobashi Kochavi	10-13, 15

VALTRUS EXHIBIT 2022
VERTIV v. VALTRUS IPR2025-00667
123 of 214

Reference	In Combination With	Claims
	Nakanishi Nakazato Patel '104 Pearse Stahl SuperVision User's Guide WebCTRL Installation Guide (2000) SuperVision Plus User's Guide	
SuperVision User's Guide	Baer Bishop Charron Collier Kobashi Kochavi Nakanishi Nakazato Patel '104 Pearse Stahl Suzuki et al. WebCTRL Installation Guide (2000) SuperVision Plus User's Guide	10-13, 15
SuperVision User's Guide	Baer Bishop Charron Collier Kobashi Kochavi Nakanishi Nakazato Patel '104 Pearse Stahl Suzuki et al. WebCTRL Installation Guide (2000) SuperVision Plus User's Guide	10-13, 15
SuperVision User's Guide	Baer Bishop Charron Collier Kobashi Kochavi Nakanishi Nakazato	10-13, 15

VALTRUS EXHIBIT 2022
VERTIV v. VALTRUS IPR2025-00667
124 of 214

Reference	In Combination With	Claims
	Patel '104 Pearse Stahl Suzuki et al. WebCTRL Installation Guide (2000) SuperVision Plus User's Guide	
WebCTRL Installation Guide (2000)	Baer Bishop Charron Collier Kobashi Kochavi Nakanishi Nakazato Patel '104 Pearse Stahl Suzuki et al. SuperVision User's Guide SuperVision Plus User's Guide	10-13, 15
SuperVision Plus User's Guide	Baer Bishop Charron Collier Kobashi Kochavi Nakanishi Nakazato Patel '104 Pearse Stahl Suzuki et al. SuperVision User's Guide WebCTRL Installation Guide (2000)	10-13, 15
SuperVision for Windows V2.6A	Baer Bishop Charron Collier Kobashi Kochavi Nakanishi Nakazato Patel '104 Pearse	10-13, 15

VALTRUS EXHIBIT 2022
VERTIV v. VALTRUS IPR2025-00667
125 of 214

Reference	In Combination With	Claims
	Stahl Suzuki et al. WebCTRL Installation Guide (2000) SuperVision Plus User's Guide	
WebCTRL System	Baer Bishop Charron Collier Kobashi Kochavi Nakanishi Nakazato Patel '104 Pearse Stahl Suzuki et al. SuperVision User's Guide SuperVision Plus User's Guide	10-13, 15
SuperVision Plus System	Baer Bishop Charron Collier Kobashi Kochavi Nakanishi Nakazato Patel '104 Pearse Stahl Suzuki et al. SuperVision User's Guide WebCTRL Installation Guide (2000)	10-13, 15
Liebert Deluxe System/3 Cooling Water System - CW	Baer Bishop Charron Collier Kobashi Kochavi Nakanishi Nakazato Patel '104 Pearse Stahl Suzuki et al.	10-13, 15

VALTRUS EXHIBIT 2022
VERTIV v. VALTRUS IPR2025-00667
126 of 214

Reference	In Combination With	Claims
	SuperVision User's Guide WebCTRL Installation Guide (2000) SuperVision Plus User's Guide	

G. P.R. 3-3(C) Disclosures for the '682 Patent

1. Identification of Prior Art for the '682 Patent

Chart	Patent / Publication No.	Citation	Country of Origin	Issue / Pub. Date
G-1	US2001/0042616	Baer	US	Nov. 22, 2001
G-2	US2004/0065097	Bash '097	US	Apr. 8, 2004
G-3	US2002/0124585	Bash '585	US	Sep. 12, 2002
G-4	US2002/0159232	Beitelmal '232	US	Oct. 31, 2002
G-5	US2004/0109288	Beitelmal '288	US	Jun. 10, 2004
G-6	US2003/0053293	Beitelmal '293	US	Mar. 20, 2003
G-7	US2002/0149911	Bishop	US	Oct. 17, 2002
G-8	US2003/0050003	Charron '003	US	Mar. 13, 2003
G-9	US4874127	Collier	US	Oct. 17, 1989
G-10	US2003/0193777	Friedrich	US	Oct. 16, 2003
G-11	US5535814	Hartman	US	Jul. 16, 1996
G-12	US4270362	Lancia	US	June 2, 1981
G-13	CA1187966A	Lunn	CA	May 28, 1985
G-14	US3384,155	Newton	US	May 21, 1968
G-15	US4732318	Osheroff	US	Mar. 22, 1988
G-16	US5076346	Otsuka	US	Dec. 31, 1991
G-17	US2003/0067745	Patel	US	Apr. 10, 2003
G-18	US4259847	Pearse	US	April 7, 1981
G-19	US2003/0200050	Sharma	US	Aug. 20, 1991
G-20	US5317907	Shimizu II	US	Jun. 7, 1994
G-21	US6209330	Timmerman	US	Apr. 3, 2001

Publications

Chart	Title	Author / Publisher	Date Published
G-22	Modeling Guide, Trace 700, Building Energy and Economic Analysis, Version 4 ("Trace 700")	Trane	2001
G-23	Applications Engineering Manual, Multiple-Chiller-System Design and Control ("2001 Chiller Control")	Trane	March 2001

VALTRUS EXHIBIT 2022
VERTIV v. VALTRUS IPR2025-00667
127 of 214

Chart	Title	Author / Publisher	Date Published
G-24	Multiple Chiller System Design and Control, Applications Engineering Manual ("1987 Chiller Control")	Trane	1987
G-25	Vav System Optimization, Critical Zone Reset, Engineers Newsletter ("1991 Engineers Newsletter")	Trane	1991
G-26	The Threefold Challenge Of … Ventilating Single-Duct VAV Systems, Engineers Newsletter ("1998 Engineers Newsletter")	Trane	1998
G-27	Installation operation Maintenance, Series R Air-Cooled Helical Rotary Liquid Chiller ("2000 RTAC Manual")	Trane	Dec. 2000
G-28	Advanced System Control Strategies, Engineers Newsletter ("EN Control Strategies")	Trane	June 2000
G-29	LHCV Chiller System Control Strategy, Engineering Bulletin ("LHCV Chiller")	Trane	Mar. 1992
G-30	turning air distribution upside down … Underfloor Air Distribution, Engineers Newsletter ("2001 Engineers Newsletter")	Trane	2001
G-31	Tracer Summit, Custom Programming, Volume 5 ("Tracer Programming Guide")	Trane	May 1997
G-32	Liebert Deluxe System/3 Operation and Maintenance Manual, SL-18350 (Revised April 2000) ("DS/3 Operation Manual 2000")	Liebert	2000

Product Sales, Offers for Sale, and/or Public Use or Disclosures

Chart	Description	Entity	Sale / Disclosure Date
G-33	Trane Air Cooled Chiller – Installations and Use in Field ("Trane Air Cooled Chiller – Installations and Use in Field")	Trane	Multiple installations and uses from 1993-2001
G-34	Liebert Deluxe System / DX System - DX	Liebert	April 1983

In addition, the below references are prior art to the '682 Patent and relevant to the state of the art, obviousness, and the knowledge of a POSITA as of the '682 Patent priority date.

Patent / Publication No.	Citation	Country of Origin	Issue / Publication Date
US 6,487,463	Stepp	US	Nov. 26, 2002
US 6,005,762	Hiroi	US	Dec. 21, 1999
US 5,474,120	Severson	US	Dec. 12, 1995
US 5,467,607	Harvey	US	Nov. 21, 1995
US 6,182,742	Takahashi	US	Feb. 6, 2001

VALTRUS EXHIBIT 2022
VERTIV v. VALTRUS IPR2025-00667
128 of 214

Patent / Publication No.	Citation	Country of Origin	Issue / Publication Date
US 5,040,376	Ueno	US	Aug. 20, 1991

Title	Author / Publisher	Date Published	Short Title
Computer Room Air Conditioners, Pinnacle 1000 Series	Trane	November 1984	CRAC Manual

2. The Asserted Claims of the '682 Patent Would Have Been Obvious

If not anticipated, the Asserted Claims of the '682 Patent would have been obvious. In particular, limitations, such as "receiving sensory data corresponding to a temperature from a subsystem in a data center," "processing the sensory data by a first agent in a hierarchy of agents to determine if the subsystems in the data center is operating within a predetermined temperature range," "adjusting a delivery rate for a cooling fluid using the first agent to keep the temperature range of the subsystem within the predetermined temperature range," "requesting a second agent from the hierarchy of agents to process the sensory data when the first agent cannot keep the temperature range within the predetermined temperature range unless the second agent redistributes the cooling fluid being delivered to one or more areas in the data center," "determining with a third agent from the hierarchy of agents the amount of cooling fluid to output when at least the first and second agent cannot keep the subsystem operating within the predetermined temperature range," "the third agent is a cooling system agent that monitors and controls one or more cooling systems that deliver a cooling fluid to the racks and rows according to the first agent and second agent," "the sensory data is derived from one or more of the following: a temperature measurement of the at least one subsystem, a temperature measurement in a plenum, and a pressure measurement in a plenum," "the hierarchy of agents corresponds to a hierarchy of subsystems and components in the data center and each agent is responsible for maintaining that each hierarchical portion of the subsystems operate within a predetermined temperature range,"

VALTRUS EXHIBIT 2022
VERTIV v. VALTRUS IPR2025-00667
129 of 214

"adjusting a delivery rate for a cooling fluid changes the volume of cooling fluid being delivered," "redistributing the cooling fluid includes decreasing the amount of cooling fluid being delivered in one area of the data center and increasing the amount of cooling fluid being delivered to another area of the data center," and "determining with a third agent from a hierarchy of agents the amount of cooling fluid to output when a pressure level associated with the cooling fluid output is not operating within the predetermined pressure range" would have been obvious to a POSITA. For starters, the charted references in G-1 *et seq.* are single reference obviousness references in light of the knowledge of a POSITA. Further, a person having ordinary skill in the art would have been motivated to modify or combine the references discussed in charts G-1, *et seq.* based on the disclosures identified and/or information that would have been generally known to a POSITA with reasonable expectations of success, including but not limited to the references cited above in relation to the state of the art. Rationales and/or motivations for such modifications or combinations include:

- Combining the prior art elements according to known methods would have yielded predictable results.
- Simple substitution of one known limitation for another would have yielded predictable results.
- Use of a known technique to improve similar devices in the same ways.
- Applying a known technique to a known system ready for improvement.
- Choosing from a finite number of identified, predictable solutions, with a reasonable expectation of success.
- Variations based on known work in the field.
- Teachings, suggestions, and/or motivations provided in the references themselves.

VALTRUS EXHIBIT 2022
VERTIV v. VALTRUS IPR2025-00667
130 of 214

In particular, the ’682 Patent discloses “Implementations of the present invention utilize distributed agents at various points in the cooling system to direct cooling fluid (e.g., airflow) to reduce power consumption and cool more effectively.” *See, e.g.*, ‘682, 4:5-9. In other words, the ’682 Patent purportedly seeks to promote cooling efficiency and reduce operating costs, while ensuring multiple computing devices are sufficiently cooled using distribute cooling agents. *Id.*

A POSITA would have been motivated by several factors, including:

- The need to reliably deliver sufficient cooling to data center racks in multiple zones of varying cooling needs;
- The desire to optimize the operation of cooling systems to provide effective cooling in an efficient manner;
- The known convenience of using sensor inputs to determine the cooling load;
- The known convenience of using multiple cooling agents;
- The known convenience of a distributed cooling system;
- A POSITA’s knowledge of the fundamental technique of establishing predetermined desired atmospheric conditions, sensing current atmospheric conditions, and adjusting operating parameters to achieve the desired atmospheric conditions; and
- A POSITA’s knowledge that making adjustments based on identified differences between actual and desired atmospheric conditions can help improve the effectiveness and efficiency of the cooling system.

Indeed, as shown below in this section, and in the corresponding claim charts, each of the prior art references recognize the need to achieve these objectives and provide solutions, including the use of adjusting multiple cooling agents based on sensory data, similar to those of the ’682 Patent. To the extent there are variations among the references in terms of how they achieve

VALTRUS EXHIBIT 2022
VERTIV v. VALTRUS IPR2025-00667
131 of 214

common objectives, such variations represent finite number alternative approaches that a POSITA would have reasonably understood would succeed. All told, the nature of these problems to be solved would have led a POSITA to incorporate any combination of the finite number of solutions disclosed, available and/or otherwise known with predictable results, an exercise involving nothing more than routine optimization of well-understood principles and components of cooling systems.

For example, Baer discloses "an apparatus and method for removing heat generated by the electronics within an enclosure from the room containing such enclosure" that includes the exemplary elements identified in the corresponding claim chart. Baer ¶[0004]; Chart G-1. A POSITA would have been motivated to turn to Baer, and/or combine it with references directed to similar objectives, for solutions that solve "to remove the heat introduced by the electronics from the rooms where such equipment is operated using the conventional room air conditioning alone" and "to supplement the cooling capacity of the room air conditioning system to promote efficient operation." Baer ¶¶ [0004]-[0005].

Bash '097 discloses "a cooling system for cooling racks in a data center" that includes the exemplary elements identified in the corresponding claim chart. Bash '097 ¶[0005]; Chart G-2. A POSITA would have been motivated to turn to Bash '097, and/or combine it with references directed to similar objectives, for solutions that include "substantially increasing the cooling fluid flow to and/or from those racks dissipating greater amounts of heat and by substantially decreasing the cooling fluid flow to and/or from those racks dissipating lesser amounts of heat, the amount of energy required to operate the cooling system may be relatively reduced" and "enable computer room air conditioning (CRAC) units located at various positions throughout the data center to operate in a more efficient manner." Bash '097 ¶[0011].

VALTRUS EXHIBIT 2022
VERTIV v. VALTRUS IPR2025-00667
132 of 214

Bash ‘585 discloses “a system for reducing the temperature of components in a computer system” that includes the exemplary elements identified in the corresponding claim chart. Bash ’585 ¶[0002]; Chart G-3. More specifically, Bash ‘585 describes “the present invention relates to a refrigeration system for cooling a plurality of components in a computer system. The refrigeration system includes a compressor for controlling the flow of refrigerant through a refrigerant line and a plurality of evaporators configured to receive the refrigerant flowing from the compressor.” Bash ’585 ¶[0009]. A POSITA would have been motivated to turn to Bash ‘585, and/or combine it with references directed to similar objectives, for solutions that prevent “the possibility that the processors will overheat” and for solutions that “reduce any temperature variation among the processors.” Bash ’585 ¶¶[0004], [0027].

Beitelmal ’232 discloses “cooling systems for electrical and electronic components and subsystems, and more particularly to air cooling of electrical and electronic components,” that includes the exemplary elements identified in the corresponding claim chart. Beitelmal ’232 ¶[0001]; Chart G-4. A POSITA would have been motivated to turn to Beitelmal ’232, and/or combine it with references directed to similar objectives, for solutions that “cool the components is to provide a cooling airflow through the enclosure in order to remove heat that is generated by operating components” and “effectively cooling the heat dissipating components of an electronic system without increasing the system's enclosure size and cost.” Beitelmal ’232 ¶¶[0002], [0005].

Beitelmal ’288 discloses “a method of cooling a plurality of racks in a data center. In this method, a cooling device is activated and a controllable partition configured to vary a supply of cooling fluid within a zone of the data center is opened,” that includes the exemplary elements identified in the corresponding claim chart. Beitelmal ’288 ¶[0005]; Chart G-5. A POSITA would have been motivated to turn to Beitelmal ’288, and/or combine it with references directed to similar

VALTRUS EXHIBIT 2022
VERTIV v. VALTRUS IPR2025-00667
133 of 214

objectives, for solutions that "vary their cooling fluid output based on the distributed needs of the data center," and "vary the volume flow of cooling fluid according to fluctuations in the cooling requirements." Beitelmal '288 ¶¶[0003]-[0004].

Beitelmal '293 discloses "electronic component cooling systems," that includes the exemplary elements identified in the corresponding claim chart. Beitelmal '293 ¶[0001]; Chart G-6. Specifically, Beitelmal '293 discloses "a method of efficiently cooling a plurality of heat generating components of an electronic system having an enclosure and a plenum located within the enclosure. In the method, at least one variable speed blower and a plurality of valves are activated" Beitelmal '293 ¶[0007]. A POSITA would have been motivated to turn to Beitelmal '293, and/or combine it with references directed to similar objectives, for solutions that "efficiently cooling a plurality of heat generating components of an electronic system having an enclosure and a plenum located within the enclosure" and use "energy efficient utilization of a plurality of blowers by operating them substantially only as needed." Beitelmal '293 ¶¶[0007], [0009].

For example, Bishop discloses "an apparatus for providing cool air to electronic module cabinets" that includes the exemplary elements identified in the corresponding claim chart. Bishop at Abstract; Chart G-7. A POSITA would have been motivated to turn to Bishop, and/or combine it with references directed to similar objectives, for solutions that solve "the need for a more efficient cool air delivery system for use in critical environments," and in particular, the "need for an air delivery system that can automatically alter air volume to module cabinets based on cabinet and/or component temperature." Bishop ¶[0032].

Charron '003 discloses "[a]n air flow management system for an Internet Data Center with rows of cabinets, the rows being located on an elevated floor and disposed in pairs wherein the front sides of the two rows face each other," that includes the exemplary elements identified in the

VALTRUS EXHIBIT 2022
VERTIV v. VALTRUS IPR2025-00667
134 of 214

corresponding claim chart. Charron ’003 at Abstract; Chart G-8. A POSITA would have been motivated to turn to Charron ’003, and/or combine it with references directed to similar objectives, for solutions that “cool heat-generating elements,” solutions for “air flow management system for an Internet Data Center,” and solutions for “maintenance of the static pressure of the fresh air superior to the static pressure of the hot air.” Charron ’003 ¶¶[0001], [0015].

Collier discloses “[a] control system operates dampers adapted to regulate the flow of the air from the plenum space to the room interior or an individual basis, and the controls further regulate the output of the HVAC or climate control unit, both as to volume and temperature,” that includes the exemplary elements identified in the corresponding claim chart. Collier at 3:56-61; Chart G-9. A POSITA would have been motivated to turn to Collier, and/or combine it with references directed to similar objectives, for solutions that “provide a computer room or the like having a control system adapted to regulate air flow individually among the individual pieces of equipment disposed in the room, and to have all such controls used in association with an uninterrupted plenum space forming a part of, or disposed beneath a multi-level raised access flooring system.” Collier at 2:56-62.

Friedrich discloses “An energy management system for one or more computer data centers, including a plurality of racks containing electronic packages,” that includes the exemplary elements identified in the corresponding claim chart. Friedrich at Abstract; Chart G-10. A POSITA would have been motivated to turn to Friedrich, and/or combine it with references directed to similar objectives, for solutions that “substantially guarantee proper operation, and to extend the life of the electronic packages arranged in the data center, it is necessary to maintain the temperatures of the packages within predetermined safe operating ranges.” Friedrich ¶[0004].

VALTRUS EXHIBIT 2022
VERTIV v. VALTRUS IPR2025-00667
135 of 214

Hartman discloses "A variable air volume heating and cooling system that provides automatic system-wide airflow balancing is disclosed." that includes the exemplary elements identified in the corresponding claim chart. Hartman at Abstract; Chart G-11. A POSITA would have been motivated to turn to Hartman, and/or combine it with references directed to similar objectives, for solutions that provide "automatic system-wide airflow balancing in which box maximum airflow settings are adjusted in response to the central fan conditions as well as local zone conditions" and "reduce the frequency and cost of rebalancing a variable air volume system. Moreover, the need remains to improve the accuracy of balancing such a system so as to maximize user comfort and operating economy." Hartman at 2:24-29.

Lancia discloses "temperature and humidity electrical/electronic control circuits and apparatus to maintain a room at a constant temperature and humidity" that include the exemplary elements identified in the corresponding claim chart. Lancia, Abstract; Chart G12. A POSITA would have been motivated to turn to Lancia, and/or combine it with references directed to similar objectives, for a solution "capable of responding to a correspondingly broad range of temperature conditions both within the zone" while ensuring "energy conservation is enhanced." Lancia, 2:47-58.

Lunn discloses "[a] system for controlling heating and cooling of sub zones in a building each having its own thermostat," that includes the exemplary elements identified in the corresponding claim chart. Lunn at Abstract; Chart G-13. A POSITA would have been motivated to turn to Lunn, and/or combine it with references directed to similar objectives, for solutions that "control of heating, cooling and ventilation systems which provides specific and complex sub-zone control particularly in systems suitable for large buildings using a central source of heat or cooling." Lunn at 2:1-8.

VALTRUS EXHIBIT 2022
VERTIV v. VALTRUS IPR2025-00667
136 of 214

Newton discloses "[a]n air condition system in which heated and chilled liquid heat exchange medium is alternatively made available to the heat exchange units in various zones," that includes the exemplary elements identified in the corresponding claim chart. Newton at Abstract; Chart G-14. A POSITA would have been motivated to turn to Newton, and/or combine it with references directed to similar objectives, for solutions that "the temperature in each room (or at least a small group of rooms) can be independently controlled" and "provide a low-cost air conditioning system in which the temperature in various zones can be individually controlled. Newton at 1:24-26, 2:30-33.

Osheroff discloses "a forced air heating and/or cooling system for regulating the temperature, for example, within a building," that includes the exemplary elements identified in the corresponding claim chart. Osheroff at 1:10-13; Chart G-15. Specifically, Osheroff discloses "[a] multizone temperature control system for a building furnishes a supply of air, heated or cooled to a preselected temperature, to all or a selected group of the temperature control zones by means of a central fan or fans that blow air over a number, such as two, three or more, of heat exchangers, each coupled with a cooling compressor or a heater." Osheroff at 2:23-29. A POSITA would have been motivated to turn to Osheroff, and/or combine it with references directed to similar objectives, for solutions "for regulating the air flow within temperature control zones within a building, and for regulating the temperature controlling air supply." Osheroff at 3:30-33.

Otsuka discloses "a duct type of air conditioner which adopts a variable air volume control system capable of controlling temperatures in a plurality of rooms independently," that includes the exemplary elements identified in the corresponding claim chart. Otsuka at 1:9-12; Chart G-16. A POSITA would have been motivated to turn to Otsuka, and/or combine it with references directed to similar objectives, for solutions for "opening and closing of each damper depending on

VALTRUS EXHIBIT 2022
VERTIV v. VALTRUS IPR2025-00667
137 of 214

the temperature in the room with the corresponding damper, or determining automatically whether to select heating and cooling, depending on each room temperature and an external air, thereby realizing an optimum and effective operation control." Otsuka at 4:55-60.

Patel discloses "cooling systems for data centers. More particularly, the invention pertains to a smart cooling system for delivering controlled amounts of cooling fluid, e.g., air, to various areas of a data center," that includes the exemplary elements identified in the corresponding claim chart. Patel ¶[0001]; Chart G-17. A POSITA would have been motivated to turn to Patel, and/or combine it with references directed to similar objectives, for solutions that "substantially independent control of the fluid supply to the racks; (3) energy efficient utilization of a cooling system by operating them substantially only as needed; (4) cooling fluid supply may be individually varied in accordance with actual or anticipated temperatures of the heat generating components; and (5) the costs associated with operating the cooling system of the invention may be substantially lower than with operating conventional cooling systems." Patel ¶[0009].

Pearse discloses "basically a constant volume system from the standpoint of design complexity and initial cost . . . [with] certain advantages over conventional constant volume systems in the areas of reduced operating costs and energy consumption. Satisfactory humidity control may be achieved without reheat and evaporator frosting is avoided. The instant invention involves a stepped reduction in blower capacity and a stepped change in heat exchange fluid flow at the air tempering heat exchanger" that includes the exemplary elements identified in the corresponding claim chart. Pearse at 1:42-51; Chart G-18. A POSITA would have been motivated to turn to Pearse, and/or combine it with references directed to similar objectives, for solutions that have are also directed to conditioning space while "reduced operating costs and energy consumption." Pearse at 1:46.

VALTRUS EXHIBIT 2022
VERTIV v. VALTRUS IPR2025-00667
138 of 214

Sharma discloses "controlling atmospheric conditions within a building. One type of building is a data center that houses numerous electronic packages. Each electronic package is arranged in one of a plurality of racks distributed throughout the data center," that includes the exemplary elements identified in the corresponding claim chart. Sharma ¶[0002]; Chart G-19. A POSITA would have been motivated to turn to Sharma, and/or combine it with references directed to similar objectives, for solutions that "adjust one or more of the quantity, quality, and distribution of a conditioned fluid throughout a data center." Sharma ¶[0012].

Shimizu discloses "a multi-type air-conditioning apparatus having a plurality of air-conditioning units connected to an outdoor unit," that includes the exemplary elements identified in the corresponding claim chart. Shimizu at 1:9-13; Chart G-20. A POSITA would have been motivated to turn to Shimizu, and/or combine it with references directed to similar objectives, for solutions that "provide an air conditioning apparatus in which a drain pipe of a personal air-conditioning unit can be omitted, thereby making the construction thereof simple and the construction therefor simple. The optimum capability corresponding to the number of personal air-conditioning units to be driven can be attained even when the total number of the personal air-conditioning units to be driven is small making it possible to always set up the comfortable air-conditioned environment." Shimizu at 2:5-14.

Timmerman discloses "air handling systems and, more particularly, to a modular cooling system for conditioning air while utilizing an existing chilled water supply. Though not limited thereto, the present invention is particularly useful in connection with large computer installations which require a continuous or near-continuous supply of conditioned air for reliable operation," that includes the exemplary elements identified in the corresponding claim chart. Timmerman at 1:5-12; Chart G-21. A POSITA would have been motivated to turn to Timmerman, and/or combine

VALTRUS EXHIBIT 2022
VERTIV v. VALTRUS IPR2025-00667
139 of 214

it with references directed to similar objectives, for solutions that have the "capability of automatically providing a variable volume and temperature of cooled air to facilities or equipment." Timmerman at 4:51-58.

The prior art Trane Air Cooled Chiller – Installations and Use in Field and Liebert Deluxe System / DX System - DX identified in charts G-33 and G-34, respectively, were widely known data center environmental control systems used throughout the industry. A POSITA would have known of Trane's and Liebert's solutions and understood their features and improvements to achieve objectives relating to efficiently supplying cooling fluid to computing racks in data centers. Therefore, a POSITA would have been motivated to combine these systems' known features with references directed to similar objectives. Similarly, a POSITA would have been motivated to consult widely available Trane and Liebert literature and Trane and Liebert newsletters relating to its systems, such as the literature disclosed in charts G-22, G-23, G-24, G-25, G-26, G-27, G-28, G-29, G-30, G-31, and G-32 for similar reasons.

Furthermore, a POSITA would have been motivated to combine with reasonable expectations of success, based on the disclosures identified therein and/or information that would have been generally known to a POSITA, any of the primary references G-1 *et. seq.* charted above with: (1) any other such G-1 *et seq.* primary reference(s); (2) any reference disclosed in the section above for specific concepts claimed in the patent; (3) any statements made in the intrinsic record of the '682 Patent, and/or (4) the knowledge of one of ordinary skill in the art, including without limitation the common general knowledge in the field as reflected by the art at the time of the alleged invention. By way of example and without prejudice to any other combinations of references, Defendants provide the following exemplary combinations, which would obviate the invention of the '682 Patent.

VALTRUS EXHIBIT 2022
VERTIV v. VALTRUS IPR2025-00667
140 of 214

Exemplary Reference Combinations

Reference	In Combination With	Claims
Baer	Bash '097 Bash '585 Beitelmal '232 Beitelmal '288 Beitelmal '293 Bishop Charron '003 Collier Friedrich Hartman Lancia LunnNewton Osheroff Otsuka Patel Pearse Sharma Shimizu Timmerman Trace 700 2001 Chiller Control 1987 Chiller Control 1991 Engineers Newsletter 1998 Engineers Newsletter 2000 RTAC Manual EN Control Strategies LHCV Chiller 2001 Engineers Newsletter Tracer Programming Guide DS/3 Operation Manual 2000 Trane Air Cooled Chiller – Installations and Use in Field	1-4, 7-10
Bash '097	Baer Bash '585 Beitelmal '232 Beitelmal '288 Beitelmal '293 Bishop Charron '003 Collier Friedrich Hartman Lancia	1-4, 7-10

VALTRUS EXHIBIT 2022
VERTIV v. VALTRUS IPR2025-00667
141 of 214

Reference	In Combination With	Claims
	Lunn Newton Osheroff Otsuka Patel Pearse Sharma Shimizu Timmerman Trace 700 2001 Chiller Control 1987 Chiller Control 1991 Engineers Newsletter 1998 Engineers Newsletter 2000 RTAC Manual EN Control Strategies LHCV Chiller 2001 Engineers Newsletter Tracer Programming Guide DS/3 Operation Manual 2000 Trane Air Cooled Chiller – Installations and Use in Field	
Bash ’585	Baer Bash ’097 Beitelmal ’232 Beitelmal ’288 Beitelmal ’293 Bishop Charron ’003 Collier Friedrich Hartman Lancia Lunn Newton Osheroff Otsuka Patel Pearse Sharma Shimizu Timmerman Trace 700 2001 Chiller Control 1987 Chiller Control	1-4, 7-10

VALTRUS EXHIBIT 2022
VERTIV v. VALTRUS IPR2025-00667
142 of 214

Reference	In Combination With	Claims
	1991 Engineers Newsletter 1998 Engineers Newsletter 2000 RTAC Manual EN Control Strategies LHCV Chiller 2001 Engineers Newsletter Tracer Programming Guide DS/3 Operation Manual 2000 Trane Air Cooled Chiller – Installations and Use in Field	
Beitelmal ’232	Baer Bash ’097 Bash ’585 Beitelmal ’288 Beitelmal ’293 Bishop Charron ’003 Collier Friedrich Hartman Lancia Lunn Newton Osheroff Otsuka Patel Pearse Sharma Shimizu Timmerman Trace 700 2001 Chiller Control 1987 Chiller Control 1991 Engineers Newsletter 1998 Engineers Newsletter 2000 RTAC Manual EN Control Strategies LHCV Chiller 2001 Engineers Newsletter Tracer Programming Guide DS/3 Operation Manual 2000 Trane Air Cooled Chiller – Installations and Use in Field	1-4, 7-10
Beitelmal ’288	Baer Bash ’097	1-4, 7-10

VALTRUS EXHIBIT 2022
VERTIV v. VALTRUS IPR2025-00667
143 of 214

Reference	In Combination With	Claims
	Bash ’585 Beitelmal ’232 Beitelmal ’293 Bishop Charron ’003 Collier Friedrich Hartman Lancia Lunn Newton Osheroff Otsuka Patel Pearse Sharma Shimizu Timmerman Trace 700 2001 Chiller Control 1987 Chiller Control 1991 Engineers Newsletter 1998 Engineers Newsletter 2000 RTAC Manual EN Control Strategies LHCV Chiller 2001 Engineers Newsletter Tracer Programming Guide DS/3 Operation Manual 2000 Trane Air Cooled Chiller – Installations and Use in Field	
Beitelmal ’293	Baer Bash ’097 Bash ’585 Beitelmal ’232 Beitelmal ’288 Bishop Charron ’003 Collier Friedrich Hartman Lancia Lunn Newton Osheroff	1-4, 7-10

VALTRUS EXHIBIT 2022
VERTIV v. VALTRUS IPR2025-00667
144 of 214

Reference	In Combination With	Claims
	Otsuka Patel Pearse Sharma Shimizu Timmerman Trace 700 2001 Chiller Control 1987 Chiller Control 1991 Engineers Newsletter 1998 Engineers Newsletter 2000 RTAC Manual EN Control Strategies LHCV Chiller 2001 Engineers Newsletter Tracer Programming Guide DS/3 Operation Manual 2000 Trane Air Cooled Chiller – Installations and Use in Field	
Bishop	Baer Bash '097 Bash '585 Beitelmal '232 Beitelmal '288 Beitelmal '293 Charron '003 Collier Friedrich Hartman Lancia Lunn Newton Osheroff Otsuka Patel Pearse Sharma Shimizu Timmerman Trace 700 2001 Chiller Control 1987 Chiller Control 1991 Engineers Newsletter 1998 Engineers Newsletter 2000 RTAC Manual	1-4, 7-10

VALTRUS EXHIBIT 2022
VERTIV v. VALTRUS IPR2025-00667
145 of 214

Reference	In Combination With	Claims
	EN Control Strategies LHCV Chiller 2001 Engineers Newsletter Tracer Programming Guide DS/3 Operation Manual 2000 Trane Air Cooled Chiller – Installations and Use in Field	
Charron '003	Baer Bash '097 Bash '585 Beitelmal '232 Beitelmal '288 Beitelmal '293 Bishop Collier Friedrich Hartman Lancia Lunn Newton Osheroff Otsuka Patel Pearse Sharma Shimizu Timmerman Trace 700 2001 Chiller Control 1987 Chiller Control 1991 Engineers Newsletter 1998 Engineers Newsletter 2000 RTAC Manual EN Control Strategies LHCV Chiller 2001 Engineers Newsletter Tracer Programming Guide DS/3 Operation Manual 2000 Trane Air Cooled Chiller – Installations and Use in Field	1-4, 7-10
Collier	Baer Bash '097 Bash '585 Beitelmal '232 Beitelmal '288	1-4, 7-10

VALTRUS EXHIBIT 2022
VERTIV v. VALTRUS IPR2025-00667
146 of 214

Reference	In Combination With	Claims
	Beitelmal ’293 Bishop Charron ’003 Friedrich Hartman Lancia Lunn Newton Osheroff Otsuka Patel Pearse Sharma Shimizu Timmerman Trace 700 2001 Chiller Control 1987 Chiller Control 1991 Engineers Newsletter 1998 Engineers Newsletter 2000 RTAC Manual EN Control Strategies LHCV Chiller 2001 Engineers Newsletter Tracer Programming Guide DS/3 Operation Manual 2000 Trane Air Cooled Chiller – Installations and Use in Field	
Friedrich	Baer Bash ’097 Bash ’585 Beitelmal ’232 Beitelmal ’288 Beitelmal ’293 Bishop Charron ’003 Collier Hartman Lancia Lunn Newton Osheroff Otsuka Patel Pearse	1-4, 7-10

VALTRUS EXHIBIT 2022
VERTIV v. VALTRUS IPR2025-00667
147 of 214

Reference	In Combination With	Claims
	Sharma Shimizu Timmerman Trace 700 2001 Chiller Control 1987 Chiller Control 1991 Engineers Newsletter 1998 Engineers Newsletter 2000 RTAC Manual EN Control Strategies LHCV Chiller 2001 Engineers Newsletter Tracer Programming Guide DS/3 Operation Manual 2000 Trane Air Cooled Chiller – Installations and Use in Field	
Hartman	Baer Bash '097 Bash '585 Beitelmal '232 Beitelmal '288 Beitelmal '293 Bishop Charron '003 Collier Friedrich Lancia Lunn Newton Osheroff Otsuka Patel Pearse Sharma Shimizu Timmerman Trace 700 2001 Chiller Control 1987 Chiller Control 1991 Engineers Newsletter 1998 Engineers Newsletter 2000 RTAC Manual EN Control Strategies LHCV Chiller 2001 Engineers Newsletter	1-4, 7-10

VALTRUS EXHIBIT 2022
VERTIV v. VALTRUS IPR2025-00667
148 of 214

Reference	In Combination With	Claims
	Tracer Programming Guide DS/3 Operation Manual 2000 Trane Air Cooled Chiller – Installations and Use in Field	
Lancia	Baer Bash '097 Bash '585 Beitelmal '232 Beitelmal '288 Beitelmal '293 Bishop Charron '003 Collier Friedrich Hartman Lunn Newton Osheroff Otsuka Patel Pearse Sharma Shimizu Timmerman Trace 700 2001 Chiller Control 1987 Chiller Control 1991 Engineers Newsletter 1998 Engineers Newsletter 2000 RTAC Manual EN Control Strategies LHCV Chiller 2001 Engineers Newsletter Tracer Programming Guide DS/3 Operation Manual 2000 Trane Air Cooled Chiller – Installations and Use in Field	1-4, 7-10
Lunn	Baer Bash '097 Bash '585 Beitelmal '232 Beitelmal '288 Beitelmal '293 Bishop Charron '003	1-4, 7-10

VALTRUS EXHIBIT 2022
VERTIV v. VALTRUS IPR2025-00667
149 of 214

Reference	In Combination With	Claims
	Collier Friedrich Hartman Lancia Newton Osheroff Otsuka Patel Pearse Sharma Shimizu Timmerman Trace 700 2001 Chiller Control 1987 Chiller Control 1991 Engineers Newsletter 1998 Engineers Newsletter 2000 RTAC Manual EN Control Strategies LHCV Chiller 2001 Engineers Newsletter Tracer Programming Guide DS/3 Operation Manual 2000 Trane Air Cooled Chiller – Installations and Use in Field	
Newton	Baer Bash ’097 Bash ’585 Beitelmal ’232 Beitelmal ’288 Beitelmal ’293 Bishop Charron ’003 Collier Friedrich Hartman Lancia Lunn Osheroff Otsuka Patel Pearse Sharma Shimizu Timmerman	1-4, 7-10

VALTRUS EXHIBIT 2022
VERTIV v. VALTRUS IPR2025-00667
150 of 214

Reference	In Combination With	Claims
	Trace 700 2001 Chiller Control 1987 Chiller Control 1991 Engineers Newsletter 1998 Engineers Newsletter 2000 RTAC Manual EN Control Strategies LHCV Chiller 2001 Engineers Newsletter Tracer Programming Guide DS/3 Operation Manual 2000 Trane Air Cooled Chiller – Installations and Use in Field	
Osheroff	Baer Bash '097 Bash '585 Beitelmal '232 Beitelmal '288 Beitelmal '293 Bishop Charron '003 Collier Friedrich Hartman Lancia Lunn Newton Osheroff Otsuka Patel Pearse Sharma Shimizu Timmerman Trace 700 2001 Chiller Control 1987 Chiller Control 1991 Engineers Newsletter 1998 Engineers Newsletter 2000 RTAC Manual EN Control Strategies LHCV Chiller 2001 Engineers Newsletter Tracer Programming Guide DS/3 Operation Manual 2000	1-4, 7-10

VALTRUS EXHIBIT 2022
VERTIV v. VALTRUS IPR2025-00667
151 of 214

Reference	In Combination With	Claims
	Trane Air Cooled Chiller – Installations and Use in Field	
Otsuka	Baer Bash '097 Bash '585 Beitelmal '232 Beitelmal '288 Beitelmal '293 Bishop Charron '003 Collier Friedrich Hartman Lancia Lunn Newton Osheroff Patel Pearse Sharma Shimizu Timmerman Trace 700 2001 Chiller Control 1987 Chiller Control 1991 Engineers Newsletter 1998 Engineers Newsletter 2000 RTAC Manual EN Control Strategies LHCV Chiller 2001 Engineers Newsletter Tracer Programming Guide DS/3 Operation Manual 2000 Trane Air Cooled Chiller – Installations and Use in Field	1-4, 7-10
Patel	Baer Bash '097 Bash '585 Beitelmal '232 Beitelmal '288 Beitelmal '293 Bishop Charron '003 Collier Friedrich	1-4, 7-10

VALTRUS EXHIBIT 2022
VERTIV v. VALTRUS IPR2025-00667
152 of 214

Reference	In Combination With	Claims
	Hartman Lancia Lunn Newton Osheroff Otsuka Pearse Sharma Shimizu Timmerman Trace 700 2001 Chiller Control 1987 Chiller Control 1991 Engineers Newsletter 1998 Engineers Newsletter 2000 RTAC Manual EN Control Strategies LHCV Chiller 2001 Engineers Newsletter Tracer Programming Guide DS/3 Operation Manual 2000 Trane Air Cooled Chiller – Installations and Use in Field	
Pearse	Baer Bash '097 Bash '585 Beitelmal '232 Beitelmal '288 Beitelmal '293 Bishop Charron '003 Collier Friedrich Hartman Lancia Lunn Newton Osheroff Otsuka Patel Sharma Shimizu Timmerman Trace 700 2001 Chiller Control	1-4, 7-10

VALTRUS EXHIBIT 2022
VERTIV v. VALTRUS IPR2025-00667
153 of 214

Reference	In Combination With	Claims
	1987 Chiller Control 1991 Engineers Newsletter 1998 Engineers Newsletter 2000 RTAC Manual EN Control Strategies LHCV Chiller 2001 Engineers Newsletter Tracer Programming Guide DS/3 Operation Manual 2000 Trane Air Cooled Chiller – Installations and Use in Field	
Sharma	Baer Bash ’097 Bash ’585 Beitelmal ’232 Beitelmal ’288 Beitelmal ’293 Bishop Charron ’003 Collier Friedrich Hartman Lancia Lunn Newton Osheroff Otsuka Patel Pearse Shimizu Timmerman Trace 700 2001 Chiller Control 1987 Chiller Control 1991 Engineers Newsletter 1998 Engineers Newsletter 2000 RTAC Manual EN Control Strategies LHCV Chiller 2001 Engineers Newsletter Tracer Programming Guide DS/3 Operation Manual 2000 Trane Air Cooled Chiller – Installations and Use in Field	1-4, 7-10
Shimizu	Baer	1-4, 7-10

VALTRUS EXHIBIT 2022
VERTIV v. VALTRUS IPR2025-00667
154 of 214

Reference	In Combination With	Claims
	Bash ’097 Bash ’585 Beitelmal ’232 Beitelmal ’288 Beitelmal ’293 Bishop Charron ’003 Collier Friedrich Hartman Lancia Lunn Newton Osheroff Otsuka Patel Pearse Sharma Timmerman Trace 700 2001 Chiller Control 1987 Chiller Control 1991 Engineers Newsletter 1998 Engineers Newsletter 2000 RTAC Manual EN Control Strategies LHCV Chiller 2001 Engineers Newsletter Tracer Programming Guide DS/3 Operation Manual 2000 Trane Air Cooled Chiller – Installations and Use in Field	
Timmerman	Baer Bash ’097 Bash ’585 Beitelmal ’232 Beitelmal ’288 Beitelmal ’293 Bishop Charron ’003 Collier Friedrich Hartman Lancia Lunn	1-4, 7-10

VALTRUS EXHIBIT 2022
VERTIV v. VALTRUS IPR2025-00667
155 of 214

Reference	In Combination With	Claims
	Newton Osheroff Otsuka Patel Pearse Sharma Shimizu Trace 700 2001 Chiller Control 1987 Chiller Control 1991 Engineers Newsletter 1998 Engineers Newsletter 2000 RTAC Manual EN Control Strategies LHCV Chiller 2001 Engineers Newsletter Tracer Programming Guide DS/3 Operation Manual 2000 Trane Air Cooled Chiller – Installations and Use in Field	
Trace 700	Baer Bash '097 Bash '585 Beitelmal '232 Beitelmal '288 Beitelmal '293 Bishop Charron '003 Collier Friedrich Hartman Lancia Lunn Newton Osheroff Otsuka Patel Pearse Sharma Shimizu Timmerman 2001 Chiller Control 1987 Chiller Control 1991 Engineers Newsletter 1998 Engineers Newsletter	1-4, 7-10

VALTRUS EXHIBIT 2022
VERTIV v. VALTRUS IPR2025-00667
156 of 214

Reference	In Combination With	Claims
	2000 RTAC Manual EN Control Strategies LHCV Chiller 2001 Engineers Newsletter Tracer Programming Guide DS/3 Operation Manual 2000 Trane Air Cooled Chiller – Installations and Use in Field	
2001 Chiller Control	Baer Bash '097 Bash '585 Beitelmal '232 Beitelmal '288 Beitelmal '293 Bishop Charron '003 Collier Friedrich Hartman Lancia Lunn Newton Osheroff Otsuka Patel Pearse Sharma Shimizu Timmerman Trace 700 1987 Chiller Control 1991 Engineers Newsletter 1998 Engineers Newsletter 2000 RTAC Manual EN Control Strategies LHCV Chiller 2001 Engineers Newsletter Tracer Programming Guide DS/3 Operation Manual 2000 Trane Air Cooled Chiller – Installations and Use in Field	1-4, 7-10
1987 Chiller Control	Baer Bash '097 Bash '585 Beitelmal '232	1-4, 7-10

VALTRUS EXHIBIT 2022
VERTIV v. VALTRUS IPR2025-00667
157 of 214

Reference	In Combination With	Claims
	Beitelmal ’288 Beitelmal ’293 Bishop Charron ’003 Collier Friedrich Hartman Lancia Lunn Newton Osheroff Otsuka Patel Pearse Sharma Shimizu Timmerman Trace 700 2001 Chiller Control 1991 Engineers Newsletter 1998 Engineers Newsletter 2000 RTAC Manual EN Control Strategies LHCV Chiller 2001 Engineers Newsletter Tracer Programming Guide DS/3 Operation Manual 2000 Trane Air Cooled Chiller – Installations and Use in Field	
1991 Engineers Newsletter	Baer Bash ’097 Bash ’585 Beitelmal ’232 Beitelmal ’288 Beitelmal ’293 Bishop Charron ’003 Collier Friedrich Hartman Lancia Lunn Newton Osheroff Otsuka	1-4, 7-10

VALTRUS EXHIBIT 2022
VERTIV v. VALTRUS IPR2025-00667
158 of 214

Reference	In Combination With	Claims
	Patel Pearse Sharma Shimizu Timmerman Trace 700 2001 Chiller Control 1987 Chiller Control 1998 Engineers Newsletter 2000 RTAC Manual EN Control Strategies LHCV Chiller 2001 Engineers Newsletter Tracer Programming Guide DS/3 Operation Manual 2000 Trane Air Cooled Chiller – Installations and Use in Field	
1998 Engineers Newsletter	Baer Bash '097 Bash '585 Beitelmal '232 Beitelmal '288 Beitelmal '293 Bishop Charron '003 Collier Friedrich Hartman Lancia Lunn Newton Osheroff Otsuka Patel Pearse Sharma Shimizu Timmerman Trace 700 2001 Chiller Control 1987 Chiller Control 1991 Engineers Newsletter 2000 RTAC Manual EN Control Strategies LHCV Chiller	1-4, 7-10

VALTRUS EXHIBIT 2022
VERTIV v. VALTRUS IPR2025-00667
159 of 214

Reference	In Combination With	Claims
	2001 Engineers Newsletter Tracer Programming Guide DS/3 Operation Manual 2000 Trane Air Cooled Chiller – Installations and Use in Field	
2000 RTAC Manual	Baer Bash '097 Bash '585 Beitelmal '232 Beitelmal '288 Beitelmal '293 Bishop Charron '003 Collier Friedrich Hartman Lancia Lunn Newton Osheroff Otsuka Patel Pearse Sharma Shimizu Timmerman Trace 700 2001 Chiller Control 1987 Chiller Control 1991 Engineers Newsletter 1998 Engineers Newsletter EN Control Strategies LHCV Chiller 2001 Engineers Newsletter Tracer Programming Guide DS/3 Operation Manual 2000 Trane Air Cooled Chiller – Installations and Use in Field	1-4, 7-10
EN Control Strategies	Baer Bash '097 Bash '585 Beitelmal '232 Beitelmal '288 Beitelmal '293 Bishop	1-4, 7-10

VALTRUS EXHIBIT 2022
VERTIV v. VALTRUS IPR2025-00667
160 of 214

Reference	In Combination With	Claims
	Charron ’003 Collier Friedrich Hartman Lancia Lunn Newton Osheroff Otsuka Patel Pearse Sharma Shimizu Timmerman Trace 700 2001 Chiller Control 1987 Chiller Control 1991 Engineers Newsletter 1998 Engineers Newsletter 2000 RTAC Manual LHCV Chiller 2001 Engineers Newsletter Tracer Programming Guide DS/3 Operation Manual 2000 Trane Air Cooled Chiller – Installations and Use in Field	
LHCV Chiller	Baer Bash ’097 Bash ’585 Beitelmal ’232 Beitelmal ’288 Beitelmal ’293 Bishop Charron ’003 Collier Friedrich Hartman Lancia Lunn Newton Osheroff Otsuka Patel Pearse Sharma	1-4, 7-10

VALTRUS EXHIBIT 2022
VERTIV v. VALTRUS IPR2025-00667
161 of 214

Reference	In Combination With	Claims
	Shimizu Timmerman Trace 700 2001 Chiller Control 1987 Chiller Control 1991 Engineers Newsletter 1998 Engineers Newsletter 2000 RTAC Manual EN Control Strategies 2001 Engineers Newsletter Tracer Programming Guide DS/3 Operation Manual 2000 Trane Air Cooled Chiller – Installations and Use in Field	
2001 Engineers Newsletter	Baer Bash '097 Bash '585 Beitelmal '232 Beitelmal '288 Beitelmal '293 Bishop Charron '003 Collier Friedrich Hartman Lancia Lunn Newton Osheroff Otsuka Patel Pearse Sharma Shimizu Timmerman Trace 700 2001 Chiller Control 1987 Chiller Control 1991 Engineers Newsletter 1998 Engineers Newsletter 2000 RTAC Manual EN Control Strategies LHCV Chiller Tracer Programming Guide DS/3 Operation Manual 2000	1-4, 7-10

VALTRUS EXHIBIT 2022
VERTIV v. VALTRUS IPR2025-00667
162 of 214

Reference	In Combination With	Claims
	Trane Air Cooled Chiller – Installations and Use in Field	
Tracer Programming Guide	Baer Bash '097 Bash '585 Beitelmal '232 Beitelmal '288 Beitelmal '293 Bishop Charron '003 Collier Friedrich Hartman Lancia Lunn Newton Osheroff Otsuka Patel Pearse Sharma Shimizu Timmerman Trace 700 2001 Chiller Control 1987 Chiller Control 1991 Engineers Newsletter 1998 Engineers Newsletter 2000 RTAC Manual EN Control Strategies LHCV Chiller 2001 Engineers Newsletter DS/3 Operation Manual 2000 Trane Air Cooled Chiller – Installations and Use in Field	1-4, 7-10
DS/3 Operation Manual 2000	Baer Bash '097 Bash '585 Beitelmal '232 Beitelmal '288 Beitelmal '293 Bishop Charron '003 Collier Friedrich	1-4, 7-10

VALTRUS EXHIBIT 2022
VERTIV v. VALTRUS IPR2025-00667
163 of 214

Reference	In Combination With	Claims
	Hartman Lancia Lunn Newton Osheroff Otsuka Patel Pearse Sharma Shimizu Timmerman Trace 700 2001 Chiller Control 1987 Chiller Control 1991 Engineers Newsletter 1998 Engineers Newsletter 2000 RTAC Manual EN Control Strategies LHCV Chiller 2001 Engineers Newsletter Trane Air Cooled Chiller – Installations and Use in Field	
Trane Air Cooled Chiller – Installations and Use in Field	Baer Bash ’097 Bash ’585 Beitelmal ’232 Beitelmal ’288 Beitelmal ’293 Bishop Charron ’003 Collier Friedrich Hartman Lancia Lunn Newton Osheroff Otsuka Patel Pearse Sharma Shimizu Timmerman Trace 700 2001 Chiller Control	1-4, 7-10

VALTRUS EXHIBIT 2022
VERTIV v. VALTRUS IPR2025-00667
164 of 214

Reference	In Combination With	Claims
	1987 Chiller Control 1991 Engineers Newsletter 1998 Engineers Newsletter 2000 RTAC Manual EN Control Strategies LHCV Chiller 2001 Engineers Newsletter DS/3 Operation Manual 2000	
Liebert Deluxe System / DX System - DX	Baer Bash '097 Bash '585 Beitelmal '232 Beitelmal '288 Beitelmal '293 Bishop Charron '003 Collier Friedrich Hartman Lancia Lunn Newton Osheroff Otsuka Patel Pearse Sharma Shimizu Timmerman Trace 700 2001 Chiller Control 1987 Chiller Control 1991 Engineers Newsletter 1998 Engineers Newsletter 2000 RTAC Manual EN Control Strategies LHCV Chiller 2001 Engineers Newsletter Trane Air Cooled Chiller – Installations and Use in Field	1-4, 7-10

VI. P.R. 3-4(D) - INVALIDITY UNDER 35 U.S.C. § 112

VALTRUS EXHIBIT 2022
VERTIV v. VALTRUS IPR2025-00667
165 of 214

Pursuant to P.R. 3-3(d), and subject to Defendants' reservation of rights, Defendants provide the following contentions relating to the invalidity of the Asserted Claims under 35 U.S.C. § 112.[19] The Asserted Claims of the Asserted Patents are invalid for lack of written description and/or enablement under 35 U.S.C. § 112, ¶1 and/or for failing to comply with the definiteness requirements of 35 U.S.C. § 112, ¶2. Defendants' contentions that the following claims are invalid under 35 U.S.C. § 112 are made in the alternative, and do not constitute, and should not be interpreted as, admissions regarding the construction or scope of the Asserted Claims, or that any of the Asserted Claims are not anticipated or rendered obvious by any prior art.

Defendants set forth exemplary limitations that are invalid for failing to comply with these requirements. The disclosures below do not attempt to identify all recitations of a given term or phrase in each claim. Where Defendants have identified an instance of a term, phrase, or limitation in a particular claim that renders the claim invalid under Section 112, Defendants contend that every instance of the challenged term, phrase, or limitation, or similar term, phrase or limitation, in the claim renders the claim invalid for the same reasons. Where a particular claim term, phrase, or limitation is identified, Defendants contend that the identified term, phrase, or limitation, as well as the surrounding claim language in context as recited in the applicable claim, suffer from the identified Section 112 defect. Although complete phrases are sometimes identified below, Defendants reserve the right to argue any word or sub-phrase within a larger phrase also violates the written description, enablement, and/or definiteness requirements of 35 U.S.C. § 112. Furthermore, where a particular claim term, phrase, or limitation is identified with respect to one

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[19] Based on Plaintiffs' contention as to the priority dates of the Asserted Claims, Defendants apply pre-AIA 35 U.S.C. § 112 here. However, to the extent that any other form of the patent statute (e.g., post-AIA) regarding invalidity for indefiniteness, non-enablement, or lack of written description applies, Defendants' invalidity contentions and analysis apply just the same.

VALTRUS EXHIBIT 2022
VERTIV v. VALTRUS IPR2025-00667
166 of 214

or more particular claims, Defendants contend that each other Asserted Claim that recites the same claim term, phrase, or limitation, or similar claim term, phrase, or limitation, is subject to the same Section 112 defect. Defendants contend that each dependent claim that depends from an independent claim that is invalid, as identified below, is also invalid for the same reasons.

In some instances, grounds upon which the Asserted Claims are invalid for failure to meet the requirements of 35 U.S.C. §112 may be based upon the apparent constructions being employed by Plaintiffs. These contentions shall not be construed as an admission that any claim construction advanced by Defendants in this case is in any way inconsistent, flawed, or erroneous. Nor should these contentions prevent Defendants from advancing claim construction and/or non-infringement positions in lieu of, or in addition to, these invalidity positions. Further these contentions shall not be construed as an admission of acquiescence to Plaintiffs' purported construction of the claim language or of other positions advanced by Plaintiffs during the course of this litigation. Defendants' invalidity contentions under 35 U.S.C. §112 may depend, in part, on the Court's claim construction, as well as Plaintiffs' alleged scope of the Asserted Claims. Consequently, Defendants identify only the issues under 35 U.S.C. §112 of which they are presently aware.

Defendants' investigation of the Asserted Patents is ongoing, and Defendants reserve the right to amend or supplement these disclosures based on further investigation and in a manner consistent with the Federal Rules of Civil Procedure, the Local Patent Rules for the Eastern District of Texas, and the Docket Control Order, or otherwise in accordance with any order or direction of this Court or agreement of the parties. These contentions are being proffered without expert disclosure or discovery. Further, Plaintiffs' Infringement Contentions fail to provide sufficient detail to fully understand its proposed application of the Asserted Claims, and Defendants reserve the right to assert additional grounds for invalidity under 35 U.S.C. § 112 in response to Plaintiffs'

VALTRUS EXHIBIT 2022
VERTIV v. VALTRUS IPR2025-00667
167 of 214

claim interpretations. Defendants also reserve the right to supplement, modify, or otherwise amend these grounds for invalidity under 35 U.S.C. § 112 based on the Court's claim construction rulings or opinions or the parties' positions or arguments taken in connection with the claim construction process. Consequently, Defendants only identify the issues under 35 U.S.C. § 112 of which they are presently aware. A more detailed basis for Defendants' indefiniteness, enablement, and/or written description defenses will be set forth in Defendants' claim construction briefing and/or expert reports on invalidity and/or in Motion[s] for Summary Judgment of Invalidity, to be served in accordance with the Court's Docket Control Order.

Subject to Defendants' reservation of rights, Defendants identify the following indefiniteness, written description, and enablement grounds with respect to the following Asserted Claims. The following does not purport to list every claim limitation to the foregoing disclosed grounds.

A. Legal Principles

1. Indefiniteness

The claims of a patent must "particularly point[] out and distinctly claim[] the subject matter which the inventor or a joint inventor regards as the invention." 35 U.S.C. § 112, second paragraph. Claims are indefinite if they, "read in light of the specification delineating the patent, and the prosecution history, fail to inform, with reasonable certainty, those skilled in the art about the scope of the invention." *Nautilus, Inc.* v. *Biosig Instruments, Inc.*, 572 U.S. 898, 901 (2014). "[I]t cannot be sufficient that a court can ascribe some meaning to a patent's claim; the definiteness inquiry trains on the understanding of a skilled artisan at the time of the patent application, not that of a court viewing matters post hoc." *Id.* at 2130.

VALTRUS EXHIBIT 2022
VERTIV v. VALTRUS IPR2025-00667
168 of 214

In evaluating indefiniteness, courts "look to the patent record—the claims, specification, and prosecution history—to ascertain if they convey to one of skill in the art with reasonable certainty the scope of the invention claimed." *Teva Pharms. USA, Inc.* v. *Sandoz, Inc*., 789 F.3d 1335, 1341 (Fed. Cir. 2015). Although "some modicum of uncertainty" is allowed to ensure "the appropriate incentives for innovation," the claims nonetheless must be "precise enough to afford clear notice of what is claimed, thereby appris[ing] the public of what is still open to them." *Nautilus*, 572 U.S. at 899 (alteration in original) (citations and internal quotation marks omitted). Ultimately, the indefiniteness inquiry is not whether "a court can ascribe *some* meaning to a patent's claims," but rather whether the claims provide "objective boundaries." *Interval Licensing LLC* v. *AOL Inc.*, 766 F.3d 1364, 1371 (Fed. Cir. 2014) (quotation omitted) (discussing *Nautilus*). Claim scope cannot depend solely on the unrestrained, subjective opinion of a particular individual purported to be practicing the invention. *Datamize LLC v. Plumtree Software, Inc.*, 417 F.3d 1342, 1350 (Fed. Cir. 2005).

A claim term can be indefinite based on multiple grounds ranging from the substantive concerns to unresolvable drafting errors, each of which can be fatal to the validity of the claims as a matter of law. For example, the Federal Circuit has repeatedly held that apparatus claims that contain method claim limitations are indefinite because it is impossible to determine when direct infringement occurs. *See, e.g.*, *Rembrandt Data Techs., LP v. AOL, LLC*, 641 F.3d 1331, 1339-40 (Fed. Cir. 2723) (an independent claim that recited both an apparatus and a method of using that apparatus was indefinite, as was its dependent claims); *IPXL Holdings v. Amazon.com*, 430 F.3d 1377, 1384 (Fed. Cir. 2005); *In re Katz Interactive Call Processing Patent Litigation*, 639 F.3d 1303, 1318 (Fed. Cir. 2723) (mixed claims "create confusion as to when direct infringement occurs because they are directed both to systems and to actions performed by" users). Claim terms that

VALTRUS EXHIBIT 2022
VERTIV v. VALTRUS IPR2025-00667
169 of 214

lack antecedent basis are indefinite. *See, e.g.*, *Allen Eng'g Corp. v. Bartell Indus., Inc.*, 299 F.3d 1336, 1348-49 (Fed. Cir. 2002) (claim ending in the middle of a claim limitation was indefinite because it was "impossible to discern the scope of such a truncated limitation"). Furthermore, means-plus-function claims, which invoke 35 U.S.C. § 112 ¶6, may be invalid as indefinite where a patent owner has failed to disclose adequate corresponding structure linked to the recited claim functionality. *Noah Sys., Inc. v. Intuit Inc.*, 675 F.3d 1302, 1311-12 (Fed. Cir. 2012).

Furthermore, when a claim includes a term of degree, such as "substantially" or "essentially," the patent must provide "some standard for measuring" that degree. *See Exmark Mfg. Co.* v. *Briggs & Stratton Power Prods. Group, LLC*, 879 F.3d 1332, 1346 (Fed. Cir. 2018). When a claim includes a term of degree, the patent "must provide 'some standard for measuring that degree' such that the claim language provides 'enough certainty to one of skill in the art when read in the context of the invention.'" *GE Lighting Solutions, LLC* v. *Lights of Am., Inc.*, 663 Fed. Appx. 938, 940 (Fed. Cir. 2016) (alteration in original) (citation omitted); *see also Interval Licensing LLC*, 766 F.3d at 1370. For terms of degree, "the patent must provide that additional information in the form of 'objective boundaries.'" *GE Lighting Solutions*, 663 Fed. Appx. at 940 (citation omitted). And the Federal Circuit's "case law is clear that the objective boundaries requirement applies to terms of degree." *Berkheimer* v. *HP Inc.*, 881 F.3d 1360, 1364 (Fed. Cir. 2018). A claim may also be indefinite if its language "'might mean several different things' and the patent itself identifies 'no informed and confident choice . . . among the contending definitions.'" *Otsuka Pharm. Co., Ltd.* v. *Torrent Pharm. Ltd.*, 151 F. Supp. 3d 525, 545 (D.N.J. 2015) (quoting *Nautilus*, 135 S. Ct. at 2130 n.8).

Claims that depend from claims that are indefinite inherit the indefiniteness of the claims from which they depend and are therefore also indefinite.

VALTRUS EXHIBIT 2022
VERTIV v. VALTRUS IPR2025-00667
170 of 214

2. Written Description

The first paragraph of 35 U.S.C. § 112 requires a patent specification to contain "a written description of the invention." The written description must "reasonably convey[] to those skilled in the art that the inventor had possession of the claimed subject matter as of the filing date." *Ariad Pharms., Inc. v. Eli Lilly & Co.*, 598 F.3d 1336, 1350 (Fed. Cir. 2010) (*en banc*) (citation omitted). If the claimed invention does not appear in the specification, the claim fails regardless of whether one of skill in the art could make or use the claimed invention. *See id.* at 1348. Establishing possession as of the filing date is crucial as "[t]he purpose of the written description requirement is to prevent an applicant from later asserting that he invented that which he did not; the applicant for a patent is therefore required to 'recount his invention in such detail that his future claims can be determined to be encompassed within his original creation.'" *Amgen Inc. v. Hoechst Marion Roussel, Inc.*, 314 F.3d 1313, 1330 (Fed. Cir. 2003). For example, a written description is inadequate where the claim in question exceeds the scope of what the patent discloses by omitting an attribute of the described invention from the limitations, thereby over-extending the reach of the claim. *ICU Med., Inc. v. Alaris Med. Sys., Inc.*, 558 F.3d 1368, 1377-78 (Fed. Cir. 2009). It is also insufficient that one of ordinary skill in the art might recognize that the disclosure could be modified in light of the prior art to arrive at the claimed subject matter. *Id.* at 1378-79 (citing *Eli Lilly*, 119 F.3d at 1566-67 (explaining that "an applicant complies with the written description requirement by describing the invention, with all its claimed limitations, *not that which makes it obvious*." (internal quotation marks omitted, emphasis added))).

Claims that depend from claims that are invalid for lack of written description support inherit the deficiencies of the claims from which they depend and are also invalid.

3. Enablement

VALTRUS EXHIBIT 2022
VERTIV v. VALTRUS IPR2025-00667
171 of 214

The enablement requirement of § 112 is separate from and in addition to the written description requirement. *Ariad*, 598 F.3d at 1344. To meet the enablement requirement, the specification must enable a POSITA to "make and use the invention" across the full scope of the claim, "without undue experimentation." *In re Wands*, 858 F.2d 731, 737 (Fed. Cir. 1988); *see Wyeth & Cord/s Corp.* v. *Abbott Labs.*, 720 F.3d 1380, 1384 (Fed. Cir. 2013); *see also LizardTech, Inc. v. Earth Res. Mapping, Inc.*, 424 F.3d 1336, 1344-45 (Fed. Cir. 2005) (A patentee must "describe the manner and process of making and using the invention so as to enable a person of skill in the art to make and use the full scope of the invention without undue experimentation."). When "the teachings set forth in the specifications provide no more than a 'plan' or 'invitation' for those of skill in the art to experiment," the claims are not enabled. *Enzo Biochem, Inc. v. Calgene, Inc.*, 188 F.3d 1362, 1374 (Fed. Cir. 1999). To determine whether "undue" experimentation is required, a court considers: "(1) the quantity of experimentation necessary, (2) the amount of direction or guidance presented, (3) the presence or absence of working examples, (4) the nature of the invention, (5) the state of the prior art, (6) the relative skill of those in the art, (7) the predictability or unpredictability of the art, and (8) the breadth of the claims." *Wands*, 858 F.2d at 737.

Claims that depend from claims that are invalid for lack of enablement inherit the deficiencies of the claims from which they depend and are also invalid.

B. Indefiniteness Contentions

Defendants contend that the Asserted Claims fail to particularly point out and distinctly claim the subject matter that the listed inventor regarded as his invention. Defendants contend that several Asserted Claims are invalid for indefiniteness under § 112 ¶2 because they fail to inform, with reasonable certainty, those skilled in the art about the scope of the claimed invention. *See Nautilus, Inc. v. Biosig Instruments, Inc.,* 134 S. Ct. 2120 (2014). Defendants provide below an

VALTRUS EXHIBIT 2022
VERTIV v. VALTRUS IPR2025-00667
172 of 214

identification of terms or phrases in Asserted Claims that render the Asserted Claims, at least as apparently construed by Plaintiffs in their Infringement Contentions, as discussed above, invalid, pursuant to 35 U.S.C. § 112 ¶2 as indefinite.

1. '277 Patent

The following terms or phrases of the Asserted Claims of the '277 patent are indefinite. Each such term or phrase lacks adequate precision or objective boundaries to afford clear notice of what is claimed and/or requires the exercise of subjective judgment. The specification and prosecution history do not adequately describe the term or phrase such that a POSITA would understand with reasonable certainty the scope of the limitation[s] incorporating such term or phrase.

- "empirical atmospheric map" (Claims 1, 6, 10, 11)
- "using software for processing input from said sensing step and for producing output in the form of said empirical atmospheric map" (Claim 1)
- "template atmospheric map[s]" (Claims 1, 11, 21)
- "identifying pattern differentials between said empirical and template atmospheric maps" (Claim 1)
- "using thermal mapping software to process input from said sensing step and to produce output in the form of said empirical atmospheric map" (Claim 6)
- "empirical thermal map" (Claims 12, 17)
- "template thermal map" (Claim 12)
- "using software for processing input from said sensing step and for producing output in the form of said empirical thermal map" (Claim 12)
- "identifying pattern differentials between said empirical and template thermal maps" (Claim 12)
- "varying at least one of the quantity, quality, and distribution of said conditioned fluid in accord with said determining step" (Claims 2, 13)

VALTRUS EXHIBIT 2022
VERTIV v. VALTRUS IPR2025-00667
173 of 214

- "correlating at least one of the location, size, and intensity of said pattern differentials to at least one of the location of said plurality of vents, the speed of said at least one blower, and the capacity of said at least one source of conditioned air" (Claims 4, 15)

- "using thermal mapping software to process input from said sensing step and to produce output in the form of said empirical thermal map, wherein said thermal mapping software triangulates locations of hot spots" (Claim 17)

- "using pattern recognition software" (Claims 7, 18)

- "generating a map composed of temperature contours that define various isothermal regions" (Claims 10, 20)

- "performing at least one of extrapolation and triangulation to determine locations of one or more hot spots" (Claims 11, 21)

2. '287 Patent

The following terms or phrases of the Asserted Claims of the '287 patent are indefinite. Each such term or phrase lacks adequate precision or objective boundaries to afford clear notice of what is claimed and/or requires the exercise of subjective judgment. The specification and prosecution history do not adequately describe the term or phrase such that a POSITA would understand with reasonable certainty the scope of the limitation[s] incorporating such term or phrase.

- "suppling said plurality of heat exchanger units with cooling fluid from an air conditioning unit" (Claim 1)

- "controlling at least one of the temperature of said cooling fluid and said air delivery by said plurality of heat exchanger units to said room" (Claim 1)

- "controlling said air delivery by said plurality of heat exchanger units comprises individually manipulating a mass flow rate of the cooling fluid supplied to each of the plurality of heat exchanger units" (Claim 1)

- "controlling at least one of a temperature of said cooling fluid and said air delivery to aid room comprises varying an output of said air conditioning unit to control the temperature of said cooling fluid" (Claim 2)

VALTRUS EXHIBIT 2022
VERTIV v. VALTRUS IPR2025-00667
174 of 214

- "increasing said cooling fluid temperature in response to a sum of the sensed temperatures at one or more locations being below said predetermined range" (Claim 5)

- "decreasing said cooling fluid temperature in response to a sum of the sensed temperatures at one or more locations being above said predetermined range" (Claim 6)

- "metering the flow of cooling fluid through each of said plurality of heat exchanger units with a plurality of valves positioned along respective cooling fluid lines configured to channel cooling fluid from the air conditioning unit to the plurality of heat exchanger units" (Claim 7)

- "metering the flow of cooling fluid through said plurality of heat exchanger units with a plurality of pumps positioned along respective cooling fluid lines configured to channel cooling fluid from the air conditioning unit to the plurality of heat exchanger units" (Claim 8)

- "manipulating a mass flow rate of the cooling fluid supplied to the plurality of heat exchanger units in substantially independent manners with respect to each of the plurality of heat exchanger units" (Claim 9)

In addition, the following phrase of the Asserted Claims of the '287 patent create a mix of apparatus and method limitations and result in claim indefiniteness because it is impossible to determine when direct infringement occurs:

- "providing a plurality of heat exchanger units" (Claim 1)

3. '179 Patent

The following terms or phrases of the Asserted Claims of the '179 patent are indefinite. Each such term or phrase lacks adequate precision or objective boundaries to afford clear notice of what is claimed and/or requires the exercise of subjective judgment. The specification and prosecution history do not adequately describe the term or phrase such that a POSITA would understand with reasonable certainty the scope of the limitation[s] incorporating such term or phrase.

- "controllable partition" (Claim 1)

VALTRUS EXHIBIT 2022
VERTIV v. VALTRUS IPR2025-00667
175 of 214

- “a zone of said data center” (Claim 1)
- “manipulating said controllable partition to vary said supply of said cooling fluid” (Claims 1, 9)
- “varying an output of said cooling device” (Claim 3)
- “increasing the supply of said cooling fluid to said zone in response to said at least one associated rack having a measured temperature that exceed said predetermined minimum set point temperature” (Claim 4)
- “decreasing an output of said cooling fluid from said cooling device in response to said decrease in cooling fluid supply to said zone exceeding said increase in cooling fluid supply to said zone” (Claim 6)
- “numerical modeling of a temperature distribution and flow characteristics of the data center” (Claim 10)
- “manipulating said cooling device in response to said numerical modeling” (Claim 10)
- “increasing an output of said cooling fluid from said cooling device in response to said decrease in cooing fluid supply to said zone falling below said increase in cooling fluid supply to said zone” (Claim 13)
- “implementing said numerical modeling to correlate at least two of temperature, velocity and pressure of said cooling fluid and power draw of at least one of said zone and said racks with said data center to thereby infer a thermal condition throughout said data center” (Claim 15)

4. ‘870 Patent

The following terms or phrases of the Asserted Claims of the ‘870 patent are indefinite. Each such term or phrase lacks adequate precision or objective boundaries to afford clear notice of what is claimed and/or requires the exercise of subjective judgment. The specification and prosecution history do not adequately describe the term or phrase such that a POSITA would understand with reasonable certainty the scope of the limitation[s] incorporating such term or phrase.

- “calculating indices of air re-circulation for the one or more heat dissipating devices based upon the detected inlet temperatures, outlet temperatures and supplied air temperatures” (Claim 1)

VALTRUS EXHIBIT 2022
VERTIV v. VALTRUS IPR2025-00667
176 of 214

- "varying a flow field setting of air" (Claim 1)
- "determining whether the indices of air re-circulation has changed in response to the varies flow field settings" (Claim 1)
- "evaluating the one or more components based upon chances in the indices of air recirculation" (Claim 1)
- "designing a substantially optimized layout of the date center" (Claim 7)
- "determining various flow field settings" (Claim 8)
- "determining a level of influence of at least one of the one or more CRAC units in response to a determination that the at least one of the one or more heat dissipating devices is influenced by at least one of the one or more CRAC units" (Claim 10)
- "varying one or more of the flow field settings in response to the indices of air re-circulation being substantially the same for the various one or more flow field settings for the at least one of the one or more heat dissipating devices" (Claim 11)
- "determining the air re-circulation index of the at least one of the one or more heat dissipating devices" (Claim 11)
- "determining the level of change in the air re-circulation index of at least one of the one or more heat dissipating devices in response to a determination that the air re-circulation index of the at least one of the one or more heat dissipating devices has changed" (Claim 12)
- "correlating the level of change in the air re-circulation index of the at least one of the one or more heat dissipating devices to an airflow characteristic of the at least one of the one or more heat dissipating devices" (Claim 12)

5. '284 Patent

The following terms or phrases of the Asserted Claims of the '284 patent are indefinite. Each such term or phrase lacks adequate precision or objective boundaries to afford clear notice of what is claimed and/or requires the exercise of subjective judgment. The specification and prosecution history do not adequately describe the term or phrase such that a POSITA would understand with reasonable certainty the scope of the limitation[s] incorporating such term or phrase.

- "plurality of returns also being in fluid communication with a plenum" (claim 10)

VALTRUS EXHIBIT 2022
VERTIV v. VALTRUS IPR2025-00667
177 of 214

- "decreasing the intake of said cooling system in response to said measured pressure falling below or equaling said predetermined minimum set point pressure." (Claim 12)
- "increasing the intake of said cooling system in response to said measured pressure exceeding said predetermined minimum set point pressure" (Claim 13)
- "the fan" (Claim 17)

These are merely examples and are not intended to be limiting. Defendants reserve all rights to amend their Invalidity Contentions under 35 U.S.C. § 112 ¶2, including after an Asserted Claim is ultimately construed by the Court, in response to any interpretation of an Asserted Claim embodied in Plaintiffs' infringement positions, and/or to account for any changes in the law concerning indefiniteness. Defendants additionally reserve the right to provide additional explanation and/or argument for their Invalidity Contentions under § 112 ¶2 including, for example, based on expert testimony. Plaintiffs have not yet revealed their proposed constructions for the terms in these patents. Once Plaintiffs have identified their proposed constructions, Plaintiffs' constructions may render certain terms indefinite. Defendants further expressly reserve the right to raise and address, once the parties have exchanged claim terms and constructions, any indefiniteness issues arising out of those exchanges.

6. '683 Patent

The following terms or phrases of the Asserted Claims of the '683 patent are indefinite. Each such term or phrase lacks adequate precision or objective boundaries to afford clear notice of what is claimed and/or requires the exercise of subjective judgment. The specification and prosecution history do not adequately describe the term or phrase such that a POSITA would understand with reasonable certainty the scope of the limitation[s] incorporating such term or phrase.

- "cooling a plurality of racks" (Claim 10)

VALTRUS EXHIBIT 2022
VERTIV v. VALTRUS IPR2025-00667
178 of 214

- "activating a cooling system and opening a plurality of returns, said returns being configured to remove cooling fluid from various locations of said data center" (Claim 10)
- "various locations of the data center" (Claim 10)
- "sensing the temperatures of said racks" (Claims 10)
- "varying said removal of said cooling fluid from said racks in response to said sensed temperatures being outside said predetermined temperature range" (Claim 10)
- "varying the supply of cooling fluid in response to varying said removal of said cooling fluid" (Claim 10)
- "decreasing the supply of said cooling fluid to said racks in response to a decrease in the removal of said cooling fluid" (Claim 11)
- "wherein at least one of said supply of cooling fluid and said return of cooling fluid is varied in response to one or more of cooling fluid flow, temperature, and pressure being outside a predetermined range" (Claim 12)
- "varying at least one of volume flow rate, velocity and direction of cooling fluid removal" (Claim 13)
- "said cooling fluid to said racks in response to an increase in the removal of said cooling fluid" (Claim 15)

These are merely examples and are not intended to be limiting. Defendants reserve all rights to amend their Invalidity Contentions under 35 U.S.C. § 112 ¶2, including after an Asserted Claim is ultimately construed by the Court, in response to any interpretation of an Asserted Claim embodied in Plaintiffs' infringement positions, and/or to account for any changes in the law concerning indefiniteness. Defendants additionally reserve the right to provide additional explanation and/or argument for their Invalidity Contentions under § 112 ¶2 including, for example, based on expert testimony. Plaintiffs have not yet revealed their proposed constructions for the terms in these patents. Once Plaintiffs have identified their proposed constructions, Plaintiffs' constructions may render certain terms indefinite. Defendants further expressly reserve

VALTRUS EXHIBIT 2022
VERTIV v. VALTRUS IPR2025-00667
179 of 214

the right to raise and address, once the parties have exchanged claim terms and constructions, any indefiniteness issues arising out of those exchanges.

7. '682 Patent

The following terms or phrases of the Asserted Claims of the '682 Patent are indefinite. Each such term or phrase lacks adequate precision or objective boundaries to afford clear notice of what is claimed and/or requires the exercise of subjective judgment. The specification and prosecution history do not adequately describe the term or phrase such that a POSITA would understand with reasonable certainty the scope of the limitation[s] incorporating such term or phrase.

- "receiving sensory data" (Claim 1)
- "receiving sensory data corresponding to a temperature from a subsystem in a data center" (Claim 1)
- "processing the sensory data" (Claim 1)
- "first agent" (Claims 1 and 3)
- "hierarchy of agents" (Claims 1, 2, 7, and 10)
- "predetermined temperature range" (Claims 1, 2, 7, and 10)
- "processing the sensory data by a first agent in a hierarchy of agents to determine if the subsystems in the data center is operating within a predetermined temperature range" (Claim 1)
- "adjusting a delivery rate for a cooling fluid" (Claims 1 and 8)
- "adjusting a delivery rate for a cooling fluid using the first agent to keep the temperature range of the subsystem within the predetermined temperature range" (Claim 1)
- "second agent" (Claims 1, 2, and 3)

VALTRUS EXHIBIT 2022
VERTIV v. VALTRUS IPR2025-00667
180 of 214

- “requesting a second agent from the hierarchy of agents to process the sensory data” (Claim 1)
- “unless the second agent redistributes the cooling fluid being delivered to one or more areas in the data center” (Claim 1)
- “requesting a second agent from the hierarchy of agents to process the sensory data when the first agent cannot keep the temperature range within the predetermined temperature range unless the second agent redistributes the cooling fluid being delivered to one or more areas in the data center” (Claim 1)
- “third agent” (Claims 2, 3, and 10)
- “determining with a third agent from the hierarchy of agents” (Claims 2 and 10)
- “determining with a third agent from the hierarchy of agents the amount of cooling fluid to output when at least the first and second agent cannot keep the subsystem operating within the predetermined temperature range” (Claim 2)
- “cooling system agent” (Claim 3)
- “the third agent is a cooling System agent that monitors and controls one or more cooling Systems that deliver a cooling fluid to the racks and rows according to the first agent and Second agent” (Claim 3)
- “hierarchy of agents corresponds to a hierarchy of subsystems” (Claim 7)
- “hierarchy of agents corresponds to a hierarchy of Subsystems and components in the data center and each agent is responsible for maintaining that each hierarchical portion of the Subsystems operate within a predetermined temperature range” (Claim 7)
- “predetermined pressure range” (Claim 10)

VALTRUS EXHIBIT 2022
VERTIV v. VALTRUS IPR2025-00667
181 of 214

- "determining with a third agent from a hierarchy of agents the amount of cooling fluid to output when a pressure level associated with the cooling fluid output is not operating within the predetermined pressure range" (Claim 10)

These are merely examples and are not intended to be limiting. Defendants reserve all rights to amend their Invalidity Contentions under 35 U.S.C. § 112 ¶2, including after an Asserted Claim is ultimately construed by the Court, in response to any interpretation of an Asserted Claim embodied in Plaintiffs' infringement positions, and/or to account for any changes in the law concerning indefiniteness. Defendants additionally reserve the right to provide additional explanation and/or argument for their Invalidity Contentions under § 112 ¶2 including, for example, based on expert testimony. Plaintiffs have not yet revealed their proposed constructions for the terms in these patents. Once Plaintiffs have identified their proposed constructions, Plaintiffs' constructions may render certain terms indefinite. Defendants further expressly reserve the right to raise and address, once the parties have exchanged claim terms and constructions, any indefiniteness issues arising out of those exchanges.

C. Written Description Contentions

Defendants contend that the Asserted Claims are invalid because the Asserted Patents do not include sufficient written description of the purported inventions claimed therein, and of the manner and process of making and using said inventions, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which the inventions pertain, or which they are most nearly connected, to make and use any of the claimed inventions. 35 U.S.C. § 112 ¶1.

Defendants contend that the specifications to which priority is sought fail to describe the full scope of the claimed inventions in sufficient detail such that one skilled in the art could reasonably conclude that the inventor had possession of the claimed invention as of the filing dates

VALTRUS EXHIBIT 2022
VERTIV v. VALTRUS IPR2025-00667
182 of 214

to which the Asserted Patents claim priority. The specifications of the Asserted Patents fail to describe the claimed inventions in a manner understandable to one of ordinary skill in the art and fail to show that the listed inventors actually invented the claimed inventions. Accordingly, each of the Asserted Claims is invalid for lack of adequate written description under 35 U.S.C. § 112 ¶1.

Defendants provide below an identification of terms or phrases in Asserted Claims that lack written description support in the specification of the corresponding Asserted Patent, at least as apparently construed by Plaintiffs in their Infringement Contentions, as discussed above, rendering the Asserted Claims invalid pursuant to 35 U.S.C. § 112 ¶1.

1. '277 Patent

The Asserted Claims of the '277 patent are invalid for failure to comply with the written description and/or enablement requirements of Section 112 ¶1.

The '277 patent specification is narrowly drawn to a specific disclosed method and system for controlling atmospheric conditions within an air-conditioned building. Based on Defendants' understanding of Plaintiffs' Infringement Contentions, Plaintiffs are attempting to construe the Asserted Claims in an idiosyncratic manner that is entirely inconsistent with the narrowly disclosed purported invention described in written specification and prosecution history of the '277 patent as well as with the understanding of one of ordinary skill in the art at the time the application that issued as the '277 patent was filed. These allegations are inconsistent with the plain language of the claims, the supporting description, and the prosecution history. Plaintiffs' apparent claim constructions render the Asserted Claims of the '277 patent overly broad in scope and would extend those claims well beyond the purported inventions described in the specification of the '277 patent.

VALTRUS EXHIBIT 2022
VERTIV v. VALTRUS IPR2025-00667
183 of 214

The specification of the '277 patent does not provide sufficient written description or enablement of the aspects of the alleged invention corresponding to following claim limitations, rendering the Asserted Claims of the '277 patent in which they appear (and any claims depending therefrom) invalid:

Claim Term	Asserted Claims
"generating an empirical atmospheric map from the results of said sensing step using software for processing input from said sensing step and for producing output in the form of said empirical atmospheric map"	1
"comparing said empirical atmospheric map to a template atmospheric map"	1
"identifying pattern differentials between said empirical and template atmospheric maps"	1
"generating an empirical thermal map of said data center from the results of said sensing step using software for processing input from said sensing step and for producing output in the form of said empirical thermal map"	12
"comparing said empirical thermal map to a template thermal map"	12
"identifying pattern differentials between said empirical and template thermal maps"	12
"correlating at least one of the location, size, and intensity of said pattern differentials to at least one of the location of said plurality of vents, the speed of said at least one blower, and the capacity of said at least one source of conditioned air"	4, 15
"using thermal mapping software to process input from said sensing step and to produce output in the form of said empirical atmospheric map"	6, 17
"using pattern recognition software"	7, 18
"generating a map composed of temperature contours that define various isothermal regions"	10, 20
"performing at least one of extrapolation and triangulation to determine locations of one or more hot spots"	11, 21

VALTRUS EXHIBIT 2022
VERTIV v. VALTRUS IPR2025-00667
184 of 214

2. '287 Patent

The Asserted Claims of the '287 patent are invalid for failure to comply with the written description and/or enablement requirements of Section 112 ¶1.

The '287 patent specification is narrowly drawn to a specific disclosed method and system for cooling a room. Based on Defendants' understanding of Plaintiffs' Infringement Contentions, Plaintiffs are attempting to construe the Asserted Claims in an idiosyncratic manner that is entirely inconsistent with the narrowly disclosed purported invention described in written specification and prosecution history of the '287 patent as well as with the understanding of one of ordinary skill in the art at the time the application that issued as the '287 patent was filed. These allegations are inconsistent with the plain language of the claims, the supporting description, and the prosecution history. Plaintiffs' apparent claim constructions render the Asserted Claims of the '287 patent overly broad in scope and would extend those claims well beyond the purported inventions described in the specification of the '287 patent.

The specification of the '287 patent does not provide sufficient written description or enablement of the aspects of the alleged invention corresponding to following claim limitations, rendering the Asserted Claims of the '287 patent in which they appear (and any claims depending therefrom) invalid:

Claim Term	Asserted Claims
"supplying said plurality of heat exchanger units with cooling fluid from an air conditioning unit"	1
"individually manipulating a mass flow rate of the cooling fluid supplied to each of the plurality of heat exchanger units"	1
"varying an output of said air conditioning unit to control the temperature of said cooling fluid"	2
"increasing said cooling fluid temperature in response to a sum of the sensed temperatures	5

VALTRUS EXHIBIT 2022
VERTIV v. VALTRUS IPR2025-00667
185 of 214

Claim Term	Asserted Claims
at one or more locations being below said predetermined range"	
"decreasing said cooling fluid temperature in response to a sum of the sensed temperatures at one or more locations being above said predetermined range"	6
"metering the flow of cooling fluid through each of said plurality of heat exchanger units with a plurality of valves positioned along respective cooling fluid lines configured to channel cooling fluid from the air conditioning unit to the plurality of heat exchanger units"	7
"metering the flow of cooling fluid through said plurality of heat exchanger units with a plurality of pumps positioned along respective cooling fluid lines configured to channel cooling fluid from the air conditioning unit to the plurality of heat exchanger units"	8
"manipulating a mass flow rate of the cooling fluid supplied to the plurality of heat exchanger units in substantially independent manners with respect to each of the plurality of heat exchanger units"	9

3. '179 Patent

The Asserted Claims of the '179 patent are invalid for failure to comply with the written description and/or enablement requirements of Section 112 ¶1.

The '179 patent specification is narrowly drawn to a specific disclosed method and system for cooling a plurality of racks in a data center. Based on Defendants' understanding of Plaintiffs' Infringement Contentions, Plaintiffs are attempting to construe the Asserted Claims in an idiosyncratic manner that is entirely inconsistent with the narrowly disclosed purported invention described in the written specification and prosecution history of the '179 patent as well as with the understanding of one of ordinary skill in the art at the time the application that issued as the '179 patent was filed. These allegations are inconsistent with the plain language of the claims, the supporting description, and the prosecution history. Plaintiffs' apparent claim constructions render

VALTRUS EXHIBIT 2022
VERTIV v. VALTRUS IPR2025-00667
186 of 214

the Asserted Claims of the '179 patent overly broad in scope and would extend those claims well beyond the purported inventions described in the specification of the '179 patent.

The specification of the '179 patent does not provide sufficient written description or enablement of the aspects of the alleged invention corresponding to following claim limitations, rendering the Asserted Claims of the '179 patent in which they appear (and any claims depending therefrom) invalid:

Claim Term	Asserted Claims
"opening a controllable partition configured to vary a supply of cooling fluid within a zone of said data center"	1
"manipulating said controllable partition to vary said supply of said cooling fluid to said zone in response to said sensed temperature being outside said predetermined temperature range"	1
"increasing the supply of said cooling fluid to said zone in response to said at least one associated rack having a measured temperature that exceed said predetermined minimum set point temperature"	4
"decreasing an output of said cooling fluid from said cooling device in response to said decrease in cooling fluid supply to said zone exceeding said increase in cooling fluid supply to said zone"	6
"manipulating said controllable partition to vary said supply of said cooling fluid to said zone in response to at least one of said sensed and received temperatures being outside of said predetermined temperature range"	9
"increasing an output of said cooling fluid from said cooling device in response to said decrease in cooing fluid supply to said zone falling below said increase in cooling fluid supply to said zone"	13

4. '870 Patent

VALTRUS EXHIBIT 2022
VERTIV v. VALTRUS IPR2025-00667
187 of 214

The Asserted Claims of the '870 patent are invalid for failure to comply with the written description and/or enablement requirements of Section 112 ¶1.

The '870 patent specification is narrowly drawn to a specific method for evaluating components in a data center. Based on Defendants' understanding of Plaintiffs' Infringement Contentions, Plaintiffs are attempting to construe the Asserted Claims in an idiosyncratic manner that is entirely inconsistent with the narrowly disclosed purported invention described in written specification and prosecution history of the '870 patent as well as with the understanding of one of ordinary skill in the art at the time the application that issued as the '870 patent was filed. These allegations are inconsistent with the plain language of the claims, the supporting description, and the prosecution history. Plaintiffs' apparent claim constructions render the Asserted Claims of the '870 patent overly broad in scope and would extend those claims well beyond the purported inventions described in the specification of the '870 patent.

The specification of the '870 patent does not provide sufficient written description or enablement of the aspects of the alleged invention corresponding to following claim limitations, rendering the Asserted Claims of the '870 patent in which they appear (and any claims depending therefrom) invalid:

Claim Term	Asserted Claims
"calculating indices of air re-circulation for the one or more heat dissipating devices based upon the detected inlet temperatures, outlet temperatures and supplied air temperatures"	1
"determining whether the indices of air re-circulation has changed in response to the varied flow field settings"	1, 8, 11
"determining a level of influence of at least one of the one or more CRAC units in response to a determination that the at least one of the one or more heat dissipating devices is	10

VALTRUS EXHIBIT 2022
VERTIV v. VALTRUS IPR2025-00667
188 of 214

Claim Term	Asserted Claims
influenced by at least one of the one or more CRAC units."	
"determining the level of change in the air re-circulation index of at least one of the one or more heat dissipating devices in response to a determination that the air re-circulation index of the at least one of the one or more heat dissipating devices has changed; correlating the level of change in the air re-circulation index of at least one of the one or more heat dissipating devices to an airflow characteristic of the at least one of the one or more heat dissipating devices"	12

5. '284 Patent

The Asserted Claims of the '284 patent are invalid for failure to comply with the written description requirements of Section 112 ¶1.

The '284 patent specification is narrowly drawn to a specific disclosed method and system for cooling a plurality of racks in a data center. Based on Defendants' understanding of Plaintiffs' Infringement Contentions, Plaintiffs are attempting to construe the Asserted Claims in an idiosyncratic manner that is entirely inconsistent with the narrowly disclosed purported invention described in the written specification and prosecution history of the '284 patent as well as with the understanding of one of ordinary skill in the art at the time the application that issued as the '284 patent was filed. These allegations are inconsistent with the plain language of the claims, the supporting description, and the prosecution history. Plaintiffs' apparent claim constructions render the Asserted Claims of the '284 patent overly broad in scope and would extend those claims well beyond the purported inventions described in the specification of the '284 patent.

The specification of the '179 patent does not provide sufficient written description or enablement of the aspects of the alleged invention corresponding to following claim limitations,

VALTRUS EXHIBIT 2022
VERTIV v. VALTRUS IPR2025-00667
189 of 214

rendering the Asserted Claims of the '179 patent in which they appear (and any claims depending therefrom) invalid:

Claim Term	Asserted Claims
"plurality of returns also being in fluid communication with a plenum"	10
"decreasing the intake of said cooling system in response to said measured pressure falling below or equaling said predetermined minimum set point pressure"	12
"increasing the intake of said cooling system in response to said measured pressure exceeding said predetermined minimum set point pressure"	13

These are merely examples and are not intended to be limiting. Defendants reserve all rights to amend their Invalidity Contentions under 35 U.S.C. § 112 ¶1, including after an Asserted Claim is ultimately construed by the Court, in response to any interpretation of an Asserted Claim embodied in Plaintiffs' infringement positions, and/or to account for any changes in the law concerning written description. Defendants additionally reserve the right to provide additional explanation and/or argument for its Invalidity Contentions under § 112 ¶1, including, for example, based on expert testimony. Plaintiffs' have not yet revealed their proposed constructions for the terms in these patents. Once Plaintiffs have identified their proposed constructions, Plaintiffs' constructions may render certain terms unsupported by adequate written description. Defendants further expressly reserves the right to raise and address, once the parties have exchanged claim terms and constructions, any written description issues arising out of those exchanges.

6. '683 Patent

The Asserted Claims of the '683 patent are invalid for failure to comply with the written description and/or enablement requirements of Section 112 ¶1.

VALTRUS EXHIBIT 2022
VERTIV v. VALTRUS IPR2025-00667
190 of 214

The '683 patent specification is narrowly drawn to a specific disclosed method and system for cooling a plurality of racks in a data center. Based on Defendants' understanding of Plaintiffs' Infringement Contentions, Plaintiff is attempting to construe the Asserted Claims in an idiosyncratic manner that is entirely inconsistent with the narrowly disclosed purported invention described in the written specification and prosecution history of the '683 patent as well as with the understanding of one of ordinary skill in the art at the time the application that issued as the '683 patent was filed. These allegations are inconsistent with the plain language of the claims, the supporting description, and the prosecution history. Plaintiffs' apparent claim constructions render the Asserted Claims of the '683 patent overly broad in scope and would extend those claims well beyond the purported inventions described in the specification of the '683 patent.

The specification of the '683 patent does not provide sufficient written description or enablement of the aspects of the alleged invention corresponding to following claim limitations, rendering the Asserted Claims of the '683 patent in which they appear (and any claims depending therefrom) invalid:

Claim Term	Asserted Claims
"activating a cooling system and opening a plurality of returns, said returns being configured to remove cooling fluid from various locations of said data center"	10
"varying said removal of said cooling fluid from said racks in response to said sensed temperatures being outside said predetermined temperature range"	10
"varying the supply of cooling fluid in response to varying said removal of said cooling fluid"	10
"decreasing the supply of said cooling fluid to said racks in response to a decrease in the removal of said cooling fluid"	11
"wherein at least one of said supply of cooling fluid and said return of cooling fluid is varied	12

VALTRUS EXHIBIT 2022
VERTIV v. VALTRUS IPR2025-00667
191 of 214

Claim Term	Asserted Claims
in response to one or more of cooling fluid flow, temperature, and pressure being outside a predetermined range"	
"varying at least one of volume flow rate, velocity and direction of cooling fluid removal"	13
"said cooling fluid to said racks in response to an increase in the removal of said cooling fluid"	15

These are merely examples and are not intended to be limiting. Defendants reserve all rights to amend their Invalidity Contentions under 35 U.S.C. § 112 ¶1, including after an Asserted Claim is ultimately construed by the Court, in response to any interpretation of an Asserted Claim embodied in Plaintiffs' infringement positions, and/or to account for any changes in the law concerning written description. Defendants additionally reserve the right to provide additional explanation and/or argument for its Invalidity Contentions under § 112 ¶1, including, for example, based on expert testimony. Plaintiffs' have not yet revealed their proposed constructions for the terms in these patents. Once Plaintiffs have identified their proposed constructions, Plaintiffs' constructions may render certain terms unsupported by adequate written description. Defendants further expressly reserves the right to raise and address, once the parties have exchanged claim terms and constructions, any written description issues arising out of those exchanges.

7. '682 Patent

The Asserted Claims of the '682 Patent are invalid for failure to comply with the written description and/or enablement requirements of Section 112 ¶1.

The '682 Patent specification is narrowly drawn to a specific disclosed method and system for controlling atmospheric conditions within an air-conditioned building. Based on Defendants' understanding of Plaintiffs' Infringement Contentions, Plaintiff is attempting to construe the

VALTRUS EXHIBIT 2022
VERTIV v. VALTRUS IPR2025-00667
192 of 214

Asserted Claims in an idiosyncratic manner that is entirely inconsistent with the narrowly disclosed purported invention described in written specification and prosecution history of the '682 Patent as well as with the understanding of one of ordinary skill in the art at the time the application that issued as the '682 Patent was filed. These allegations are inconsistent with the plain language of the claims, the supporting description, and the prosecution history. Plaintiffs' apparent claim constructions render the Asserted Claims of the '682 Patent overly broad in scope and would extend those claims well beyond the purported inventions described in the specification of the '682 Patent.

The specification of the '682 Patent does not provide sufficient written description or enablement of the aspects of the alleged invention corresponding to the following terms of the Asserted Claims, rendering the Asserted Claims of the '682 Patent in which they appear (and any claims depending therefrom) invalid:

Claim Term	Asserted Claims
"receiving sensory data"	1
"receiving sensory data corresponding to a temperature from a subsystem in a data center"	1
"processing the sensory data"	1
"first agent"	1, 3
"hierarchy of agents"	1, 2, 7, 10
"predetermined temperature range"	1, 2, 7, 10
"processing the sensory data by a first agent in a hierarchy of agents to determine if the subsystems in the data center is operating within a predetermined temperature range"	1
"adjusting a delivery rate for a cooling fluid"	1, 8
"adjusting a delivery rate for a cooling fluid using the first agent to keep the temperature range of the subsystem within the predetermined temperature range"	1
"second agent"	1, 2, 3
"requesting a second agent from the hierarchy of agents to process the sensory data"	1

VALTRUS EXHIBIT 2022
VERTIV v. VALTRUS IPR2025-00667
193 of 214

Claim Term	Asserted Claims
"unless the second agent redistributes the cooling fluid being delivered to one or more areas in the data center"	1
"requesting a second agent from the hierarchy of agents to process the sensory data when the first agent cannot keep the temperature range within the predetermined temperature range unless the second agent redistributes the cooling fluid being delivered to one or more areas in the data center"	1
"third agent"	2, 3, 10
"determining with a third agent from the hierarchy of agents"	2, 10
"determining with a third agent from the hierarchy of agents the amount of cooling fluid to output when at least the first and second agent cannot keep the subsystem operating within the predetermined temperature range"	2
"cooling system agent"	3
"the third agent is a cooling System agent that monitors and controls one or more cooling Systems that deliver a cooling fluid to the racks and rows according to the first agent and Second agent"	3
"hierarchy of agents corresponds to a hierarchy of subsystems"	7
"hierarchy of agents corresponds to a hierarchy of Subsystems and components in the data center and each agent is responsible for maintaining that each hierarchical portion of the Subsystems operate within a predetermined temperature range"	7
"predetermined pressure range"	10
"determining with a third agent from a hierarchy of agents the amount of cooling fluid to output when a pressure level associated with the cooling fluid output is not operating within the predetermined pressure range"	10

These are merely examples and are not intended to be limiting. Defendants reserve all rights to amend their Invalidity Contentions under 35 U.S.C. § 112 ¶1, including after an Asserted Claim is ultimately construed by the Court, in response to any interpretation of an Asserted Claim

VALTRUS EXHIBIT 2022
VERTIV v. VALTRUS IPR2025-00667
194 of 214

embodied in Plaintiffs' infringement positions, and/or to account for any changes in the law concerning written description. Defendants additionally reserve the right to provide additional explanation and/or argument for its Invalidity Contentions under § 112 ¶1, including, for example, based on expert testimony. Plaintiffs' have not yet revealed their proposed constructions for the terms in these patents. Once Plaintiffs have identified their proposed constructions, Plaintiffs' constructions may render certain terms unsupported by adequate written description. Defendants further expressly reserves the right to raise and address, once the parties have exchanged claim terms and constructions, any written description issues arising out of those exchanges.

D. Enablement Contentions

Defendants contend that, at the time of Plaintiffs' claimed priority date, the patent applications to which Plaintiffs claim priority did not enable one of ordinary skill in the art to make and use the full scope of the claimed inventions without undue experimentation. Accordingly, each of the Asserted Claims is invalid for lack of enablement under 35 U.S.C. § 112 ¶1.

For example, the specification of the Asserted Patents does not provide sufficient enablement of the aspects of the alleged invention corresponding to following claim limitations, rendering the Asserted Claims in which they appear (and any claims depending therefrom) invalid.

1. '277 Patent

The Asserted Claims of the '277 patent are invalid for failure to comply with the enablement requirement of Section 112 ¶1.

The '277 patent specification is narrowly drawn to a specific disclosed method and system for controlling atmospheric conditions within an air-conditioned building. Based on Defendants' understanding of Plaintiffs' Infringement Contentions, Plaintiffs are attempting to construe the Asserted Claims in an idiosyncratic manner that is entirely inconsistent with the narrowly disclosed

VALTRUS EXHIBIT 2022
VERTIV v. VALTRUS IPR2025-00667
195 of 214

purported invention described in written specification and prosecution history of the '277 patent as well as with the understanding of one of ordinary skill in the art at the time the application that issued as the '277 patent was filed. These allegations are inconsistent with the plain language of the claims, the supporting description, and the prosecution history. Defendants' apparent claim constructions render the Asserted Claims of the '277 patent overly broad in scope and would extend those claims well beyond the purported inventions enabled by the specification of the '277 patent.

The specification of the '277 patent does not provide an enabling disclosure of the aspects of the alleged invention corresponding to following claim limitations, rendering the Asserted Claims of the '277 patent in which they appear (and any claims depending therefrom) invalid:

Claim Term	Asserted Claims
"generating an empirical atmospheric map from the results of said sensing step using software for processing input from said sensing step and for producing output in the form of said empirical atmospheric map"	1
"comparing said empirical atmospheric map to a template atmospheric map"	1
"identifying pattern differentials between said empirical and template atmospheric maps"	1
"generating an empirical thermal map of said data center from the results of said sensing step using software for processing input from said sensing step and for producing output in the form of said empirical thermal map"	12
"comparing said empirical thermal map to a template thermal map"	12
"identifying pattern differentials between said empirical and template thermal maps"	12
"correlating at least one of the location, size, and intensity of said pattern differentials to at least one of the location of said plurality of vents, the speed of said at least one blower, and the capacity of said at least one source of conditioned air"	4, 15

VALTRUS EXHIBIT 2022
VERTIV v. VALTRUS IPR2025-00667
196 of 214

Claim Term	Asserted Claims
"using thermal mapping software to process input from said sensing step and to produce output in the form of said empirical atmospheric map"	6, 17
"using pattern recognition software"	7, 18
"generating a map composed of temperature contours that define various isothermal regions"	10, 20
"performing at least one of extrapolation and triangulation to determine locations of one or more hot spots"	11, 21

2. '287 Patent

The Asserted Claims of the '287 patent are invalid for failure to comply with the enablement requirement of Section 112 ¶1.

The '287 patent specification is narrowly drawn to a specific disclosed method and system for cooling a room. Based on Defendants' understanding of Plaintiffs' Infringement Contentions, Plaintiffs are attempting to construe the Asserted Claims in an idiosyncratic manner that is entirely inconsistent with the narrowly disclosed purported invention described in written specification and prosecution history of the '287 patent as well as with the understanding of one of ordinary skill in the art at the time the application that issued as the '287 patent was filed. These allegations are inconsistent with the plain language of the claims, the supporting description, and the prosecution history. Plaintiffs' apparent claim constructions render the Asserted Claims of the '287 patent overly broad in scope and would extend those claims well beyond the purported inventions enabled by the specification of the '287 patent.

The specification of the '287 patent does not provide an enabling disclosure of the aspects of the alleged invention corresponding to following claim limitations, rendering the Asserted Claims of the '287 patent in which they appear (and any claims depending therefrom) invalid:

VALTRUS EXHIBIT 2022
VERTIV v. VALTRUS IPR2025-00667
197 of 214

Claim Term	Asserted Claims
"supplying said plurality of heat exchanger units with cooling fluid from an air conditioning unit"	1
"individually manipulating a mass flow rate of the cooling fluid supplied to each of the plurality of heat exchanger units"	1
"varying an output of said air conditioning unit to control the temperature of said cooling fluid"	2
"increasing said cooling fluid temperature in response to a sum of the sensed temperatures at one or more locations being below said predetermined range"	5
"decreasing said cooling fluid temperature in response to a sum of the sensed temperatures at one or more locations being above said predetermined range"	6
"metering the flow of cooling fluid through each of said plurality of heat exchanger units with a plurality of valves positioned along respective cooling fluid lines configured to channel cooling fluid from the air conditioning unit to the plurality of heat exchanger units"	7
"metering the flow of cooling fluid through said plurality of heat exchanger units with a plurality of pumps positioned along respective cooling fluid lines configured to channel cooling fluid from the air conditioning unit to the plurality of heat exchanger units"	8
"manipulating a mass flow rate of the cooling fluid supplied to the plurality of heat exchanger units in substantially independent manners with respect to each of the plurality of heat exchanger units"	9

3. '179 Patent

The Asserted Claims of the '179 patent are invalid for failure to comply with the enablement requirement of Section 112, ¶1.

The '179 patent specification is narrowly drawn to a specific disclosed method and system for cooling a plurality of racks in a data center. Based on Defendants' understanding of Plaintiffs'

VALTRUS EXHIBIT 2022
VERTIV v. VALTRUS IPR2025-00667
198 of 214

Infringement Contentions, Plaintiffs are attempting to construe the Asserted Claims in an idiosyncratic manner that is entirely inconsistent with the narrowly disclosed purported invention described in written specification and prosecution history of the '179 patent as well as with the understanding of one of ordinary skill in the art at the time the application that issued as the '179 patent was filed. These allegations are inconsistent with the plain language of the claims, the supporting description, and the prosecution history. Plaintiffs' apparent claim constructions render the Asserted Claims of the '179 patent overly broad in scope and would extend those claims well beyond the purported inventions enabled by the specification of the '179 patent.

The specification of the '179 patent does not provide an enabling disclosure of the aspects of the alleged invention corresponding to following claim limitations, rendering the Asserted Claims of the '179 patent in which they appear (and any claims depending therefrom) invalid:

Claim Term	Asserted Claims
"opening a controllable partition configured to vary a supply of cooling fluid within a zone of said data center"	1
"manipulating said controllable partition to vary said supply of said cooling fluid to said zone in response to said sensed temperature being outside said predetermined temperature range"	1
"increasing the supply of said cooling fluid to said zone in response to said at least one associated rack having a measured temperature that exceed said predetermined minimum set point temperature"	4
"decreasing an output of said cooling fluid from said cooling device in response to said decrease in cooling fluid supply to said zone exceeding said increase in cooling fluid supply to said zone"	6
"manipulating said controllable partition to vary said supply of said cooling fluid to said zone in response to at least one of said sensed and received temperatures being outside of said predetermined temperature range"	9

VALTRUS EXHIBIT 2022
VERTIV v. VALTRUS IPR2025-00667
199 of 214

Claim Term	Asserted Claims
"increasing an output of said cooling fluid from said cooling device in response to said decrease in cooing fluid supply to said zone falling below said increase in cooling fluid supply to said zone"	13

4. '870 Patent

The Asserted Claims of the '870 patent are invalid for failure to comply with the enablement requirement of Section 112 ¶1.

The '870 patent specification is narrowly drawn to a specific method for evaluating components in a data center. Based on Defendants' understanding of Plaintiffs' Infringement Contentions, Plaintiffs are attempting to construe the Asserted Claims in an idiosyncratic manner that is entirely inconsistent with the narrowly disclosed purported invention described in written specification and prosecution history of the '870 patent as well as with the understanding of one of ordinary skill in the art at the time the application that issued as the '870 patent was filed. These allegations are inconsistent with the plain language of the claims, the supporting description, and the prosecution history. Plaintiffs' apparent claim constructions render the Asserted Claims of the '870 patent overly broad in scope and would extend those claims well beyond the purported inventions enabled by the specification of the '870 patent.

The specification of the '870 patent does not provide an enabling disclosure of the aspects of the alleged invention corresponding to following claim limitations, rendering the Asserted Claims of the '870 patent in which they appear (and any claims depending therefrom) invalid:

Claim Term	Asserted Claims
"calculating indices of air re-circulation for the one or more heat dissipating devices based upon the detected inlet temperatures, outlet temperatures and supplied air temperatures"	1

VALTRUS EXHIBIT 2022
VERTIV v. VALTRUS IPR2025-00667
200 of 214

Claim Term	Asserted Claims
"determining whether the indices of air re-circulation has changed in response to the varied flow field settings"	1, 8, 11
"determining a level of influence of at least one of the one or more CRAC units in response to a determination that the at least one of the one or more heat dissipating devices is influenced by at least one of the one or more CRAC units."	10
"determining the level of change in the air re-circulation index of at least one of the one or more heat dissipating devices in response to a determination that the air re-circulation index of the at least one of the one or more heat dissipating devices has changed; correlating the level of change in the air re-circulation index of at least one of the one or more heat dissipating devices to an airflow characteristic of the at least one of the one or more heat dissipating devices"	12

5. '284 Patent

The Asserted Claims of the '284 patent are invalid for failure to comply with the enablement requirement of Section 112 ¶1.

The '284 patent specification is narrowly drawn to a specific disclosed method and system for cooling a plurality of racks in a data center. Based on Defendants' understanding of Plaintiffs' Infringement Contentions, Plaintiffs are attempting to construe the Asserted Claims in an idiosyncratic manner that is entirely inconsistent with the narrowly disclosed purported invention described in the written specification and prosecution history of the '284 patent as well as with the understanding of one of ordinary skill in the art at the time the application that issued as the '284 patent was filed. These allegations are inconsistent with the plain language of the claims, the supporting description, and the prosecution history. Plaintiffs' apparent claim constructions render

VALTRUS EXHIBIT 2022
VERTIV v. VALTRUS IPR2025-00667
201 of 214

the Asserted Claims of the '284 patent overly broad in scope and would extend those claims well beyond the purported inventions enabled in the specification of the '284 patent.

The specification of the '284 patent does not provide sufficient written description or enablement of the aspects of the alleged invention corresponding to following claim limitations, rendering the Asserted Claims of the '284 patent in which they appear (and any claims depending therefrom) invalid:

Claim Term	Asserted Claims
"plurality of returns also being in fluid communication with a plenum"	10
"decreasing the intake of said cooling system in response to said measured pressure falling below or equaling said predetermined minimum set point pressure"	12
"increasing the intake of said cooling system in response to said measured pressure exceeding said predetermined minimum set point pressure"	13

These are merely examples and are not intended to be limiting. Defendants reserve all rights to amend their Invalidity Contentions under 35 U.S.C. § 112 ¶1, including after an Asserted Claim is ultimately construed by the Court, in response to any interpretation of an Asserted Claim embodied in Plaintiffs' infringement positions, and/or to account for any changes in the law concerning enablement. Defendants additionally reserve the right to provide additional explanation and/or argument for its Invalidity Contentions under § 112 ¶1, including, for example, based on expert testimony. Plaintiffs' have not yet revealed their proposed constructions for the terms in these patents. Once Plaintiffs have identified their proposed constructions, Plaintiffs' constructions may render certain terms not enabled. Defendants further expressly reserves the right to raise and address, once the parties have exchanged claim terms and constructions, any enablement issues arising out of those exchanges.

VALTRUS EXHIBIT 2022
VERTIV v. VALTRUS IPR2025-00667
202 of 214

6. '683 Patent

The Asserted Claims of the '683 patent are invalid for failure to comply with the enablement requirement of Section 112, ¶1.

The '683 patent specification is narrowly drawn to a specific disclosed method and system for cooling a plurality of racks in a data center. Based on Defendants' understanding of Plaintiffs' Infringement Contentions, Plaintiff is attempting to construe the Asserted Claims in an idiosyncratic manner that is entirely inconsistent with the narrowly disclosed purported invention described in written specification and prosecution history of the '683 patent as well as with the understanding of one of ordinary skill in the art at the time the application that issued as the '683 patent was filed. These allegations are inconsistent with the plain language of the claims, the supporting description, and the prosecution history. Plaintiffs' apparent claim constructions render the Asserted Claims of the '683 patent overly broad in scope and would extend those claims well beyond the purported inventions enabled by the specification of the '683 patent.

The specification of the '683 patent does not provide an enabling disclosure of the aspects of the alleged invention corresponding to following claim limitations, rendering the Asserted Claims of the '683 patent in which they appear (and any claims depending therefrom) invalid:

Claim Term	Asserted Claims
"activating a cooling system and opening a plurality of returns, said returns being configured to remove cooling fluid from various locations of said data center"	10
"varying said removal of said cooling fluid from said racks in response to said sensed temperatures being outside said predetermined temperature range"	10
"varying the supply of cooling fluid in response to varying said removal of said cooling fluid"	10

VALTRUS EXHIBIT 2022
VERTIV v. VALTRUS IPR2025-00667
203 of 214

Claim Term	Asserted Claims
"decreasing the supply of said cooling fluid to said racks in response to a decrease in the removal of said cooling fluid"	11
"wherein at least one of said supply of cooling fluid and said return of cooling fluid is varied in response to one or more of cooling fluid flow, temperature, and pressure being outside a predetermined range"	12
"varying at least one of volume flow rate, velocity and direction of cooling fluid removal"	13
"said cooling fluid to said racks in response to an increase in the removal of said cooling fluid"	15

These are merely examples and are not intended to be limiting. Defendants reserve all rights to amend their Invalidity Contentions under 35 U.S.C. § 112 ¶1, including after an Asserted Claim is ultimately construed by the Court, in response to any interpretation of an Asserted Claim embodied in Plaintiffs' infringement positions, and/or to account for any changes in the law concerning enablement. Defendants additionally reserve the right to provide additional explanation and/or argument for its Invalidity Contentions under § 112 ¶1, including, for example, based on expert testimony. Plaintiffs' have not yet revealed their proposed constructions for the terms in these patents. Once Plaintiffs have identified their proposed constructions, Plaintiffs' constructions may render certain terms not enabled. Defendants further expressly reserves the right to raise and address, once the parties have exchanged claim terms and constructions, any enablement issues arising out of those exchanges.

7. '682 Patent

The Asserted Claims of the '682 Patent are invalid for failure to comply with the enablement requirement of Section 112 ¶1.

VALTRUS EXHIBIT 2022
VERTIV v. VALTRUS IPR2025-00667
204 of 214

The ’682 Patent specification is narrowly drawn to a specific disclosed method and system for controlling atmospheric conditions within an air-conditioned building. Based on Defendants’ understanding of Plaintiffs’ Infringement Contentions, Plaintiff is attempting to construe the Asserted Claims in an idiosyncratic manner that is entirely inconsistent with the narrowly disclosed purported invention described in written specification and prosecution history of the ’682 Patent as well as with the understanding of one of ordinary skill in the art at the time the application that issued as the ’682 Patent was filed. These allegations are inconsistent with the plain language of the claims, the supporting description, and the prosecution history. Plaintiffs’ apparent claim constructions render the Asserted Claims of the ’682 Patent overly broad in scope and would extend those claims well beyond the purported inventions enabled by the specification of the ’682 Patent.

The specification of the ’682 Patent does not provide an enabling disclosure of the aspects of the alleged invention corresponding to the following terms of the Asserted Claims, rendering the Asserted Claims of the ’682 Patent in which they appear (and any claims depending therefrom) invalid:

Claim Term	Asserted Claims
“receiving sensory data”	1
“receiving sensory data corresponding to a temperature from a subsystem in a data center”	1
“processing the sensory data”	1
“first agent”	1, 3
“hierarchy of agents”	1, 2, 7, 10
“predetermined temperature range”	1, 2, 7, 10
“processing the sensory data by a first agent in a hierarchy of agents to determine if the subsystems in the data center is operating within a predetermined temperature range”	1
“adjusting a delivery rate for a cooling fluid”	1, 8
“adjusting a delivery rate for a cooling fluid using the first agent to keep the temperature	1

VALTRUS EXHIBIT 2022
VERTIV v. VALTRUS IPR2025-00667
205 of 214

Claim Term	Asserted Claims
range of the subsystem within the predetermined temperature range"	
"second agent"	1, 2, 3
"requesting a second agent from the hierarchy of agents to process the sensory data"	1
"unless the second agent redistributes the cooling fluid being delivered to one or more areas in the data center"	1
"requesting a second agent from the hierarchy of agents to process the sensory data when the first agent cannot keep the temperature range within the predetermined temperature range unless the second agent redistributes the cooling fluid being delivered to one or more areas in the data center"	1
"third agent"	2, 3, 10
"determining with a third agent from the hierarchy of agents"	2, 10
"determining with a third agent from the hierarchy of agents the amount of cooling fluid to output when at least the first and second agent cannot keep the subsystem operating within the predetermined temperature range"	2
"cooling system agent"	3
"the third agent is a cooling System agent that monitors and controls one or more cooling Systems that deliver a cooling fluid to the racks and rows according to the first agent and Second agent"	3
"hierarchy of agents corresponds to a hierarchy of subsystems"	7
"hierarchy of agents corresponds to a hierarchy of Subsystems and components in the data center and each agent is responsible for maintaining that each hierarchical portion of the Subsystems operate within a predetermined temperature range"	7
"predetermined pressure range"	10
"determining with a third agent from a hierarchy of agents the amount of cooling fluid to output when a pressure level associated with the cooling fluid output is not operating within the predetermined pressure range"	10

VALTRUS EXHIBIT 2022
VERTIV v. VALTRUS IPR2025-00667
206 of 214

These are merely examples and are not intended to be limiting. Defendants reserve all rights to amend their Invalidity Contentions under 35 U.S.C. § 112 ¶1, including after an Asserted Claim is ultimately construed by the Court, in response to any interpretation of an Asserted Claim embodied in Plaintiffs' infringement positions, and/or to account for any changes in the law concerning enablement. Defendants additionally reserve the right to provide additional explanation and/or argument for its Invalidity Contentions under § 112 ¶1, including, for example, based on expert testimony. Plaintiffs' have not yet revealed their proposed constructions for the terms in these patents. Once Plaintiffs have identified their proposed constructions, Plaintiffs' constructions may render certain terms not enabled. Defendants further expressly reserves the right to raise and address, once the parties have exchanged claim terms and constructions, any enablement issues arising out of those exchanges.

VII. P.R. 3-4 – DOCUMENT PRODUCTION

A. P.R. 3-4(a) Disclosures

Pursuant to P.R. 3-4(a), Defendants have produced representative technical documentation within their possession, custody, and control that show the operation of aspects or elements of the Accused Instrumentalities identified by Plaintiffs in their Infringement Contentions. *See* DBNP_0000001 – DBNP_0005768 and TPNP_0000001 – TPNP_0005768. Defendants reserve the right to supplement these disclosures with additional documentation. Defendants will produce relevant computer source code for inspection at the office of its outside counsel upon request.

B. P.R. 3-4(b) Disclosures

In accordance with P.R. 3-4(b), Defendants are producing a set of prior art references identified in these Invalidity Contentions for prior art related to the Asserted Patents. Defendants are also producing prior art references and additional documentation concerning prior art systems

VALTRUS EXHIBIT 2022
VERTIV v. VALTRUS IPR2025-00667
207 of 214

and methods, including business records evidencing sales of equipment and software tools deployed in such prior art systems and methods prior to the applicable priority dates of the Asserted Patents. Such documents can be found at the following Bates range: DBNP_0005788 – DBNP_0015673 and TPNP_0005789 – TPNP_0015674. Any prior art references not in English are produced with an English translation of the portion(s) relied upon. These prior art references are cited herein and support the contentions presented. Defendants' search for prior art references, additional documentation, and/or corroborating evidence concerning prior art systems and methods is ongoing. Accordingly, Defendants reserve the right to supplement their production, as provided by the local rules, as additional prior art references, additional documentation, and/or corroborating evidence concerning prior art documents/apparatuses, and methods are obtained during the course of discovery. Such additional evidence may include physical equipment specimens and/or source code evidence associated one or more prior art systems or methods obtained through further investigation and discovery.

VIII. PATENT SUBJECT MATTER INELIGIBILITY CONTENTIONS

The following Subject Matter Ineligibility Contentions incorporate by reference the Subject Matter Ineligibility Contentions set forth in Appendices 1 – 7. These Subject Matter Ineligibility Contentions are subject to revision and amendment pursuant to F.R.C.P. 26(e) and the Court's Docket Control Order, to the extent appropriate, in light of further investigation and discovery regarding the defenses below, the Court's construction of the Asserted Claims of the Asserted Patents, and/or the review and analysis of expert witnesses.

Whether an invention is eligible for patent protection under 35 U.S.C. § 101 is a "threshold test." *See Bilski v. Kappos*, 130 S. Ct. 3218, 3225 (2010). Section 101 lists four broad categories of patent-eligible subject matter but is subject to "an important implicit exception" that "[l]aws of nature,

VALTRUS EXHIBIT 2022
VERTIV v. VALTRUS IPR2025-00667
208 of 214

natural phenomena, and abstract ideas," which form the "basic tools of scientific and technological work," are not eligible for patent protection. *Alice Corp. Pty. Ltd. v. CLS Bank Int'l*, 573 U.S. 208, 216 (2014) (internal quotation marks omitted). "The 'abstract ideas' category embodies 'the longstanding rule that an idea of itself is not patentable.'" *Id.* at 209 (quoting *Gottschalk v. Benson*, 409 U.S. 63, 67 (1972) (quoting *Rubber-Tip Pencil Co. v. Howard*, 87 U.S. 498 (1874)).

Alice set forth a two-step inquiry. "First, we determine whether the *claims* at issue are directed to one of those patent-ineligible concepts." *Id.* at 217 (emphasis added). In making this inquiry, the claims "must be considered as a whole." *Alice*, 573 U.S. at 218 n.3 (quoting *Diamond v. Diehr*, 450 U.S. 175, 188 (1981)). In analyzing step one, courts consider "whether the claims in the patent focus on a specific means or method, or are instead directed to a result or effect that itself is the abstract idea and merely invokes generic process and machinery." *Two-Way Media Ltd. v. Comcast Cable Commc'ns, LLC*, 874 F.3d 1329, 1337 (Fed. Cir. 2017); *see also Free Stream Media Corp. v. Alphonso Inc.*, 996 F.3d 1355, 1363 (Fed. Cir. 2021).

"[M]ental processes, and abstract intellectual concepts are not patentable, as they are the basic tools of scientific and technological work." *Gottschalk v. Benson*, 409 U.S. 63, 67 (1972); *see also Cybersource Corp. v. Retail Decisions, Inc.*, 654 F.3d 1366, 99 USPQ2d 1690 (Fed. Cir. 2011) (claim "fails to recite patent-eligible subject matter because it is drawn to an unpatentable mental process—a subcategory of unpatentable abstract ideas"). For example, a patent that claims use of a mathematical formula for calculating updated values of alarm limits for alarms that monitor process variables (such as temperature) during a chemical process was directed to ineligible subject matter. *Parker v. Flook*, 437 U.S. 584, 594-95 (1978). The Supreme Court rejected the notion that the recitation of a practical application for the calculation could alone make

VALTRUS EXHIBIT 2022
VERTIV v. VALTRUS IPR2025-00667
209 of 214

the invention patentable, stating that any "competent draftsman could attach some form of post-solution activity to almost any mathematical formula." *Id*. at 590.

If the claims recite an abstract idea, the second step requires a "search for an 'inventive concept'—an element or combination of elements that is 'sufficient to ensure that the patent in practice amounts to significantly more than a patent upon the [ineligible concept] itself.'" *Alice*, 573 U.S. at 218 (quoting *Mayo Collaborative Servs. v. Prometheus Labs., Inc.*, 566 U.S. 66, 73 (2016)). "A claim that recites an abstract idea must include 'additional features' to ensure 'that the claim is more than a drafting effort designed to monopolize the abstract idea.'" *Id.* at 221 (quoting *Mayo*, 566 U.S. at 78) (alterations omitted). The recited "additional features must be more than well-understood, routine, conventional activity." *Ultramercial, Inc. v. Hulu, LLC*, 772 F.3d 1335, 1339 (Fed. Cir. 2013) (internal quotations omitted).

Application of an abstract idea using "conventional and well understood techniques" does not "supply an inventive concept." *BSG Tech. LLC v. Buyseasons, Inc.*, 899 F.3d 1281, 1290–91 (Fed. Cir. 2018); *see also Baggage Airline Guest Servs., Inc. v. Roadie. Inc.,* 351 F. Supp. 3d 753, 761 (D. Del. 2019), *aff'd*, 2019 WL 5703890 (Fed. Cir. Nov. 5, 2019) (finding that "reciting generic computer functions and the use of generic computer elements to achieve a more efficient way of 'coordinating and monitoring baggage delivery'" is not an inventive concept). A "critical difference" exists between "patenting a particular concrete solution to a problem" and "attempting to patent the abstract idea of a solution to the problem in general," because the overbroad functional claiming of the latter "purport[s] to monopolize every potential solution to the problem." *BSG*, 899 F.3d at 1290–91. Further, claims are subject matter ineligible if "[w]hat is claimed is simply a generic environment in which to carry out the abstract idea." *Yu v. Apple Inc.*, 1 F.4th 1040, 1043 (Fed. Cir. 2021)

VALTRUS EXHIBIT 2022
VERTIV v. VALTRUS IPR2025-00667
210 of 214

As required by the Standing Order, Defendants identify each Asserted Claim of the ’277, ‘287, ‘179, ‘870, ‘284, ‘683, and ‘682 patents as being directed to the abstract ideas. The Asserted Claims of the ‘277 and ‘682 patents are directed to the abstract idea of collecting, organizing, and analyzing data to evaluate a cooling system and make appropriate adjustments. The Asserted Claims of the ‘287, ‘179, ‘284, and ‘683 patents are similarly directed to the abstract idea of collecting and analyzing data to evaluate a cooling system and make appropriate adjustments. The Asserted Claims of the ‘870 patent are directed to the abstract idea of collecting data and analyzing the data using a mathematical formula to evaluate a cooling system. There is nothing in any of the Asserted Claims to transform these abstract ideas into inventive concepts or patent eligible subject matter. *See* Appendices 1 – 7.

VALTRUS EXHIBIT 2022
VERTIV v. VALTRUS IPR2025-00667
211 of 214

Dated: April 1, 2025

OF COUNSEL:

Respectfully Submitted,

By: /s/ *William E. Davis, III*
William E. Davis, III
Texas Bar No. 24047416
bdavis@davisfirm.com
Ty Wilson
Texas State Bar No. 24106583
twilson@davisfirm.com

Davis Firm PC
213 N. Fredonia Street, Suite 230
Longview, TX 75601
903-230-9090

Timothy P. Maloney
Daniel J. Schwartz
Allison Strong
NIXON PEABODY LLP
70 West Madison, Suite 5200
Chicago, Illinois 60602
312-977-4400
tmaloney@nixonpeabody.com
djschwartz@nixonpeabody.com
astrong@nixonpeabody.com

Kara R. Fussner
Husch Blackwell LLP – St. Louis
190 Carondelet Plaza
Suite 600
St. Louis, MO 63105-3341
314-480-1500
Fax: 314-480-1505
kara.fussner@huschblackwell.com

Mark P. Bhuptani
Husch Blackwell LLP
1801 Pennsylvania Aveue, NW
Suite 1000
Washington, DC 20006
202-378-9310
Fax: 202-378-2319
mark.bhuptani@huschblackwell.com

Attorneys for Defendant TierPoint, LLC

VALTRUS EXHIBIT 2022
VERTIV v. VALTRUS IPR2025-00667
212 of 214

Brett Pinkus
State Bar No. 24076625
brett.pinkus@wickphillips.com
Bryan J. Wick
State Bar No. 24003169
bryan.wick@wickphillips.com
WICK PHILLIPS GOULD & MARTIN, LLP
3131 McKinney Avenue, Suite 500
Dallas, Texas 75204
Telephone: (214) 692-6200
Facsimile: (214) 692-6255

Attorneys for Defendant DataBank Holdings Ltd

VALTRUS EXHIBIT 2022
VERTIV v. VALTRUS IPR2025-00667
213 of 214

CERTIFICATE OF SERVICE

The undersigned certifies that the foregoing document and all attachments thereto have been served on all counsel of record on the date provided below.

Dated: April 1, 2025

s/ Timothy P. Maloney
Timothy P. Maloney

VALTRUS EXHIBIT 2022
VERTIV v. VALTRUS IPR2025-00667
214 of 214