UNITED STATES DISTRICT COURT
CENTRAL DISTRICT OF CALIFORNIA
CIVIL MINUTES—GENERAL

Case No.	**CV 12-06365-JGB (RZx)**	Date	May 21, 2015
Title	***Electric Power Group, LLC v. Alstom, S.A., et al.***		

Present: The Honorable	JESUS G. BERNAL, UNITED STATES DISTRICT JUDGE

MAYNOR GALVEZ	Not Reported
Deputy Clerk	Court Reporter

Attorney(s) Present for Plaintiff(s):	Attorney(s) Present for Defendant(s):
None Present	None Present

Proceedings: **Order GRANTING Defendants' Motion for Summary Judgment of Invalidity under 35 U.S.C. § 101 (Doc. No. 187);**
DENYING AS MOOT Plaintiff's Motion for Partial Summary Judgment of Direct Infringement (Doc. No. 191);
DENYING AS MOOT Defendants' Motion for Claim Construction (Doc. No. 186); and
DENYING AS MOOT Plaintiff's and Defendants' Motions in Limine (Doc. Nos. 185, 188, 189, 194, 202) (IN CHAMBERS)

Before the Court is Defendants Alstom, S.A.; Alstom Grid, Inc.; Psymetrix Ltd.; and Alstom Limited's motion for summary judgment of invalidity under 35 U.S.C. § 101. For the reasons below, the motion is GRANTED.

Before the Court are also Plaintiff Electric Power Group, LLC's motion for summary judgment of direct infringement and Defendants' motion for claim construction, as well as motions in limine filed by both parties. Because the Court's ruling on Defendants' motion for summary judgment is case-dispositive, the remaining motions are DENIED AS MOOT.

I. BACKGROUND

A. Procedural Background

Plaintiff Electric Power Group, LLC ("EPG" or "Plaintiff") alleges that Defendants Alstom, S.A.; Alstom Grid, Inc.; Psymetrix Ltd.; and Alstom Limited (collectively "Defendants") infringe three of its patents. Asserted in this action are claims 4, 7, 9, 12, 19, and 24 of U.S.

Patent No. 7,233,843; claims 1, 5, 18, 21, 38, 49, and 53 of U.S. Patent No. 8,060,259; and claims 9, 12, and 17 of U.S. Patent No. 8,401,710.[1]

B. Technological Background

The patents asserted in this action all come from continuations of the same patent application, and so share a specification. The invention disclosed by these patents relates to the management of electric power grids. When electric power is being generated, transmitted, and distributed, the demand placed on various parts of the system needs to be monitored and managed to prevent system failures, for instance, because of overload of a particular part of the system. Because power systems are enormous and complex, the task of managing them is daunting:

> Due to the enormous task at hand, there are a number of organizations responsible for overseeing these power generation, transmission and distribution activities. For example, there are over 3,000 utilities, thousands of generators, 22 Reliability Coordinators, and 153 Control Areas (CAs) in the United States for monitoring and control of generation, transmission and distribution of electricity. While all these different entities at various different levels are involved in generation, transmission and distribution of electricity as well as monitoring and control in a power grid, there is no single integrated system that can be used to monitor and manage the electric power grid in real-time across all of the different elements of the power system. For example, there is no information management system for the power grid, which is integrated across multiple business systems, companies and Control Areas to manage the security, timeliness, accuracy or accessibility of information for grid operations, reliability, market operations and system security.

'843 Patent at 1:63-2:14.

The patents-in-suit attempt to solve this problem by disclosing an integrated system for allowing real-time monitoring of metrics associated with the generation, transmission, and distribution of electric power across different elements of the power system, including those operated by different entities.

II. LEGAL STANDARD

A. Motion for Summary Judgment

Pursuant to Rule 56 of the Federal Rules of Civil Procedure, a "court shall grant summary judgment if the movant shows that there is no genuine issue as to any material fact and that the movant is entitled to judgment as a matter of law." Fed. R. Civ. P. 56(a).

The Supreme Court's 1986 trilogy of Celotex v. Catrett, 477 U.S. 317; Anderson v. Liberty Lobby, Inc., 477 U.S. 242; and Matsushita Electric Industrial Co. v. Zenith Radio Corp., 475 U.S. 574, requires that a party seeking summary judgment show the absence of a genuine issue

[1] The asserted claims are reproduced in Appendix A.

of material fact. Once the moving party has done so, the nonmoving party must "go beyond the pleadings and by [its] own affidavits, or by the depositions, answers to interrogatories, and admissions on file, designate specific facts showing that there is a genuine issue for trial." See Celotex, 477 U.S. at 324. "When the moving party has carried its burden under Rule 56(c), its opponent must do more than simply show that there is some metaphysical doubt as to the material facts." Matsushita, 475 U.S. at 586. "If the [opposing party's] evidence is merely colorable, or is not significantly probative, summary judgment may be granted." Liberty Lobby, 477 U.S. at 249-50. "[I]nferences to be drawn from the underlying facts," however, "must be viewed in the light most favorable to the party opposing the motion." See Matsushita, 475 U.S. at 587.

B. Patent-Eligible Subject Matter

Section 101 of the Patent Act defines the classes of patentable subject matter: "Whoever invents or discovers any new and useful process, machine, manufacture, or composition of matter, or any new and useful improvement thereof, may obtain a patent therefor, subject to the conditions and requirements of this title." 35 U.S.C. § 101.

Despite the apparent breadth of this language, § 101 has long contained "an important implicit exception: Laws of nature, natural phenomena, and abstract ideas are not patentable." Ass'n for Molecular Pathology v. Myriad Genetics, 133 S. Ct. 2107, 2116 (2013) (quoting Mayo Collaborative Services v. Prometheus Laboratories, 132 S. Ct. 1289, 1293 (2012)). The Supreme Court recently reaffirmed this principle in Alice Corp. v. CLS Bank Int'l, 134 S. Ct. 2347 (2014). The "concern that drives this exclusionary principle [is] one of pre-emption. . . . Monopolization of [laws of nature, natural phenomena, and abstract ideas] through the grant of a patent might tend to impede innovation more than it would tend to promote it, thereby thwarting the primary object of the patent laws." Id. at 2354.

However, the Supreme Court has repeatedly stressed the need to "tread carefully in construing this exclusionary principle lest it swallow all of patent law. At some level, all inventions embody, use, reflect, rest upon, or apply laws of nature, natural phenomena, or abstract ideas. Thus, an invention is not rendered ineligible for patent simply because it involves an abstract concept." Id. (internal citations omitted).

The Supreme Court has set forth a "framework for distinguishing patents that claim . . . abstract ideas from those that claim patent-eligible applications of those concepts. First, we determine whether the claims at issue are directed to one of those patent-ineligible concepts. If so, we then ask, 'what else is there in the claims before us?' . . . to determine whether the additional elements transform the nature of the claim into a patent-eligible application." Id. at 2355 (internal citations omitted). Step two of the analysis is a "search for an 'inventive concept'—i.e., 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." Id. (internal citations omitted).

Because patents are presumed valid, see 35 U.S.C. § 282, an alleged infringer asserting an invalidity defense bears the burden of proving invalidity by clear and convincing evidence. Microsoft Corp. v. i4i L.P., 131 S. Ct. 2238, 2242 (2011).

III. DISCUSSION

To determine patent eligibility, the Court "must first determine whether the claims at issue are directed to a patent-ineligible concept." Alice Corp. Pty. v. CLS Bank Int'l, 134 S. Ct. 2347, 2355 (2014). The Court concludes that the asserted claims from all three patents are drawn to the abstract idea of monitoring and analyzing data from multiple sources simultaneously.

Although each asserted claim articulates the invention slightly differently, claim 12 of the '710 patent exemplifies the general concept claimed by the patents. This claim recites:

> 12. A method of detecting events on an interconnected electric power grid in real time over a wide area and automatically analyzing the events on the interconnected electric power grid, the method comprising:
>
> receiving a plurality of data streams, each of the data streams comprising sub-second, time stamped synchronized phasor measurements wherein the measurements in each stream are collected in real time at geographically distinct points over the wide area of the interconnected electric power grid, the wide area comprising at least two elements from among control areas, transmission companies, utilities, regional reliability coordinators, and reliability jurisdictions;
>
> receiving data from other power system data sources, the other power system data sources comprising at least one of transmission maps, power plant locations, EMS/SCADA systems;
>
> receiving data from a plurality of non-grid data sources;
>
> detecting and analyzing events in real-time from the plurality of data streams from the wide area based on at least one of limits, sensitivities and rates of change for one or more measurements from the data streams and dynamic stability metrics derived from analysis of the measurements from the data streams including at least one of frequency instability, voltages, power flows, phase angles, damping, and oscillation modes, derived from the phasor measurements and the other power system data sources in which the metrics are indicative of events, grid stress, and/or grid instability, over the wide area;
>
> displaying the event analysis results and diagnoses of events and associated ones of the metrics from different categories of data and the derived metrics in visuals, tables, charts, or combinations thereof, the data comprising at least one of monitoring data, tracking data, historical data, prediction data, and summary data;
>
> displaying concurrent visualization of measurements from the data streams and the dynamic stability metrics directed to the wide area of the interconnected electric power grid;
>
> accumulating and updating the measurements from the data streams and the dynamic stability metrics, grid data, and non-grid data in real time as to wide area and local area portions of the interconnected electric power grid; and
>
> deriving a composite indicator of reliability that is an indicator of power grid vulnerability and is derived from a combination of one or more real time measurements or computations of measurements from the data streams and

the dynamic stability metrics covering the wide area as well as non-power grid data received from the non-grid data source.

The "concept embodied by the majority of the limitations," Ultramercial, Inc. v. Hulu, LLC, 772 F.3d 709, 715 (Fed. Cir. 2014), reduces to the following conceptual elements:

1. Receiving data from different parts of an electric power grid
2. Receiving data from other power system data sources
3. Receiving data from non-grid data sources
4. Detecting and analyzing events in real-time from the data sources
5. Displaying the event analysis results
6. Displaying a visualization of the data received
7. Accumulating and updating the data from the multiple data sources
8. Deriving a composite indicator of reliability from the multiple data sources

"Although certain additional limitations, such as [enumerating the metrics to be collected and analyzed from the data sources], add a degree of particularity, the concept embodied by the majority of the limitations describes only the abstract idea of" collecting, analyzing, and displaying data from multiple sources simultaneously. Ultramercial, 772 F.3d at 715. Limitations 1-3 above merely recite the abstract idea of collecting data from various different data sources, while limitations 4-8 recite the abstract idea of analyzing and displaying that data.

EPG asserts two primary arguments to avoid this conclusion. First, EPG faults Defendants for failing to provide "evidence" that the asserted claims are directed to an abstract concept. ("Opp'n," Doc. No. 211 at 6.) This argument is unpersuasive. Although a determination of patent eligibility "may contain underlying factual issues," it is ultimately a "legal conclusion." Accenture Global Servs., GmbH v. Guidewire Software, Inc., 728 F.3d 1336, 1341 (Fed. Cir. 2013). While Defendants are required to prove any underlying factual issues by clear and convincing evidence, i4i, 131 S. Ct. at 2242, EPG fails to point to any particular factual issue on which Defendants' argument depends. Indeed, of the evidence submitted by EPG in opposition to Defendants' motion for summary judgment, all evidence properly characterized as factual is consistent with Defendants' position. The only evidence that contradicts Defendants' position is evidence that is improperly directed to legal conclusions rather than factual disputes. (See, e.g., Winter Decl., Doc. No. 211-2 ¶ 53 ("Monitoring the electric power grid is not an abstract idea.").)

Second, EPG argues that the claimed invention "constitutes a substantial technological advance" and that "[t]he claimed inventions are novel over the prior art." (Opp'n at 7.) This may be true, but it is irrelevant to whether the patent attempts to claim an abstract idea. "A self-driving car . . . might be novel and—its implementation, at least—non-obvious. But that doesn't make the concept of a self-driving car any less abstract. The first inventor to successfully create a self-driving car might be able to patent his specific implementation of the idea with appropriately narrow claim language, limited to the inventor's particular implementation. But the inventor could not patent self-driving cars in the abstract, no matter how novel . . . his particular self-driving car might be." Hewlett Packard Co. v. ServiceNow, Inc., No. 14-CV-00570, 2015 WL 1133244, at *10 (N.D. Cal. Mar. 10, 2015).

Having determined that the claim is drawn to the abstract idea of monitoring and analyzing data from disparate sources, the Court now turns to the second step of the Alice analysis. This step requires the Court "to determine whether the claims do significantly more than simply

describe that abstract method." Ultramercial, 772 F.3d at 715. While the claim does include additional limitations, the Court concludes that the limitations, considered both individually and as an ordered combination, fail to supply the necessary "inventive concept" to transform the nature of the claims from a patent on the ineligible concept into a patent-eligible application of the concept. See Alice, 134 S. Ct. at 2355.

In considering the additional elements of the claim, the Court recognizes that "limiting an abstract idea to one field of use" does not make an abstract idea patentable. Bilski v. Kappos, 561 U.S. 593, 612 (2010). Similarly, "[a]dding routine additional steps . . . does not transform an otherwise abstract idea into patent-eligible subject matter." Ultramercial, 772 F.3d at 716. Nor can the inclusion of "conventional or obvious" elements or insignificant post- or pre-solution activity save an otherwise invalid claim from invalidation. Id. (citing Mayo Collaborative Servs. v. Prometheus Labs., Inc., 132 S. Ct. 1289, 1298 (2012)); Parker v. Flook, 437 U.S. 584, 590 (1978). Finally, while the machine-or-transformation test is a "useful and important clue" for determining patent eligibility, "satisfying the machine-or-transformation test, by itself, is not sufficient to render a claim patent-eligible." DDR Holdings, LLC v. Hotels.com, L.P., 773 F.3d 1245, 1255-56 (Fed. Cir. 2014) (citing Bilski v. Kappos, 561 U.S. 593, 604 (2010)).

The most significant additional limitations in the asserted claim are those that limit the claim to monitoring and analyzing data in the context of electric power grids. But the fact that the claim is limited to power grid management does not change the nature of the claims from abstract to concrete. "Flook establishes that limiting an abstract idea to one field of use . . . did not make the concept patentable." Bilski, 561 U.S. at 612 (citing Flook, 437 U.S. 584).

Similarly, while enumerating the particular metrics to be monitored does limit the claim's scope, it does not transform the nature of the claims into a patent-eligible application of the abstract idea. The enumerated metrics are simply routine, conventional metrics, so limiting the claims to monitoring and analyzing those metrics does not supply any sort of "inventive concept." Alice, 134 S. Ct. at 2355. It merely limits the abstract idea to one field of use, which is insufficient under Flook.

Indeed, even if some of the enumerated metrics were novel or non-routine, it would not transform the nature of the claims. See Ultramercial, 772 F.3d at 715 ("We do not agree . . . that the addition of merely novel or non-routine components to the claimed idea necessarily turns an abstraction into something concrete."). Like the claims at issue in Ultramercial, the claims asserted in this action "simply instruct the practitioner to implement the abstract idea with routine, conventional activity. None of these . . . individual steps, viewed 'both individually and "as an ordered combination"' transform the nature of the claim into patent eligible subject matter." Ultramercial, 772 F.3d at 715 (citing Alice, 134 S. Ct. at 2355).

Conceptual limitations 4 through 8 above also fail to transform the nature of the claims because they merely recite routine additional steps and insignificant post-solution activity. See Ultramercial, 772 F.3d at 716. Limitation 4—detecting and analyzing events in real-time from the data sources—is purely conventional post-solution activity. Even if the specification disclosed some novel way of performing the analysis, the claim limitation is described in purely generic, abstract terms, which would cover even conventional forms of analysis and event detection. It may be that reciting a particular form of detection and analysis to be performed would be sufficient to render the claim a patent-eligible application of the abstract concept, but generically reciting that the data is to be analyzed and events are to be detected is insufficient to

change the nature of the claim from an "abstraction into something concrete." See Ultramercial, 772 F.3d at 715.

Limitation 5—displaying the event analysis results—is similarly insufficient to change the nature of the claims. Displaying the results of an analysis is a conventional activity and nothing in this limitation supplies an additional inventive concept. Limitation 5 is merely a recitation of insignificant post-solution activity. See id. at 716.

Limitation 6—displaying a visualization of the data received—is merely a recitation of insignificant post-solution activity, which can be accomplished using conventional methods. Plaintiff argues that this limitation "cover[s] advanced visualizations including dynamic graphic and geographic displays." (Opp'n at 9 n.5.) But the claim language isn't limited to "advanced visualizations." Even if the specification discloses some novel form of data visualization, nothing in the claim language limits the claims to such novel visualizations. The inventors could have chosen to claim only particular novel data visualization techniques enabled by the specification, and such a claim limitation might well be sufficient to supply an inventive concept. But because the claim limitation merely recites generic visualization of the data, it does nothing more than add routine and conventional post-solution activity.

Limitation 7—accumulating and updating the data from the multiple data sources—also adds only insignificant post-solution activity that can be performed using conventional methods. Plaintiff does not contend—nor could it plausibly contend—that accumulating and updating data from various sources requires anything more than conventional and routine programming procedures. Thus, this limitation fails to provide an inventive concept.

Finally, limitation 8—deriving a composite indicator of reliability from the multiple data sources—might be sufficient to supply an inventive concept if it claimed a particular, novel method of deriving a composite indicator of reliability from the multiple data sources. However, the claim is not so limited. Instead, it generically recites deriving a composite indicator without requiring any particular novel method of deriving the indicator. Accordingly, this claim limitation would be satisfied by any composite indicator of reliability, even one derived using conventional or routine methods. Accordingly, this limitation merely recites insignificant post-solution activity and fails to provide an inventive concept sufficient to alter the nature of the claim.

Because the claim recites an abstract idea, merely limiting that idea to a particular field of use and adding insignificant or routine post-solution activity are insufficient to transform the claim from an attempt to patent the abstract idea into a patent-eligible application of the idea. Because the claim fails both steps of the Supreme Court's Alice analysis, the claim is invalid under 35 U.S.C. § 101.

The Court reaches this conclusion fully cognizant of the need to "tread carefully in construing this exclusionary principle lest it swallow all of patent law." Alice, 134 S. Ct. at 2354. The Court assumes for purposes of this motion that the development of software capable of simultaneously monitoring and analyzing data from multiple power grid operators represents a novel development in the art. Accordingly, there may well be a patentable invention couched somewhere in the specification of the patents-in-suit. But for purposes of patent-eligibility under 35 U.S.C. § 101, it is the claims that matter. Rather than specifically claiming an invention that enables computers to perform simultaneous monitoring and analysis of multiple data sources

across a power grid, the patents-in-suit claim the abstract idea of performing the simultaneous monitoring.

In other words, while the specification may indeed disclose a patentable specific solution to a problem—i.e. some specific way of enabling a computer to monitor data from multiple sources across an electric power grid—the asserted claims purport to monopolize every potential solution to the problem. This raises exactly the kind of preemption concerns that drive the exclusionary principle. Granting a monopoly on a particular method for simultaneously monitoring data from multiple power grid operators would incentivize further innovation in the form of alternative methods for achieving the same result. In contrast, granting a monopoly on the result itself—the successful monitoring of data from multiple power grid operators—inhibits innovation by prohibiting other inventors from developing their own solutions to the problem without first licensing the abstract idea.

In sum, there is a critical difference between patenting a particular concrete solution to a problem and attempting to patent the abstract idea of a solution to the problem in general. Cf. DDR Holdings, LLC v. Hotels.com, L.P., 773 F.3d 1245, 1259 (Fed. Cir. 2014) (finding patent eligibility because "the claims at issue do not attempt to preempt every application of the idea of increasing sales by making two web pages look the same . . . . Rather, they recite a specific way to automate the creation of a composite web page . . ."). Here, the problem is the need to monitor and analyze data from multiple distinct parts of a power grid. It may very well be valid to patent a particular implementation for solving this problem. But that does not mean the first inventor to develop such an implementation can prohibit all others from developing their own solutions by patenting the abstract notion of solving the problem. That is exactly what EPG's claims attempt to do, and as such, they are directed to the patent-ineligible abstract idea of solving the problem, rather than to a patent-eligible solution to the problem.

The Court has separately considered all other claims asserted in this action and has determined that rearticulating the same analysis for each one is unnecessary, as they all suffer the same basic infirmity: rather than attempting to claim a concrete solution of how to monitor and analyze data from multiple different power grid sources, they all attempt to claim the abstract idea of monitoring and analyzing data from multiple different power grid sources. In so doing, they are monopolizing the abstract idea of solving the problem rather than merely monopolizing a single concrete solution to the problem. The additional limitations contained in the various claims merely recite "routine or obvious" elements, or add insignificant pre- or post-solution activity, and thus fail to provide an inventive concept sufficient to transform the claims into concrete applications of the abstract idea. Because of this, the asserted claims are directed to patent-ineligible subject matter and are invalid under 35 U.S.C. § 101. See Content Extraction & Transmission LLC v. Wells Fargo Bank, Nat. Ass'n, 776 F.3d 1343, 1348 (Fed. Cir. 2014) (approving the use of representative claims where "all the claims are substantially similar and linked to the same abstract idea").

IV. CONCLUSION

Because the asserted claims are directed to patent-ineligible subject matter, Defendants are entitled to judgment as a matter of law. This renders any remaining factual disputes immaterial. Because there are no genuine disputes of material fact, summary judgment is appropriate. Accordingly, Defendants' motion for summary judgment is GRANTED.

Because the Court's ruling on Defendants' motion for summary judgment is case-dispositive, the remaining motions are DENIED AS MOOT.

IT IS SO ORDERED.

Appendix A

U.S. Patent No. 7,233,843

Claim 1 (not asserted)

A real-time performance monitoring system for monitoring an electric power grid, comprising:

a monitor computer for monitoring at least one of reliability metrics, power grid operations metrics, generation metrics, transmission metrics, suppliers metrics, grid infrastructure security metrics or markets metrics over a plurality of control areas of the electric power grid operated on a plurality of different platforms by a plurality of different business systems or companies;

a database for storing the metrics being monitored by the monitor computer; and

at least one display computer in at least one of said plurality of control areas of the electric power grid, the at least one display computer having a monitor for displaying a visualization of the metrics being monitored by the monitor computer,

said at least one display computer in one of said plurality of control areas being adapted to enable an operator located in and responsible for monitoring the one of said plurality of control areas to monitor one or more of said plurality of control areas that are different from the control area in which the operator is located.

Claim 4

The real-time performance monitoring system of claim 1,

wherein the monitor computer includes an application for monitoring the grid infrastructure security metrics, and wherein said application performs real-time monitoring of at least one of system vulnerability including phasor measurements and changes thereof or exposure in terms of at least one of population or cities.

Claim 6 (not asserted)

The real-time performance monitoring system of claim 1,

wherein at least one of the monitor computer or said at least one display computer performs at least one of historical tracking, prediction or actions related to the metrics being monitored, wherein the actions related to the metrics being monitored include actions related to one or more violations of one or more predefined thresholds, wherein

the one or more violations are communicated in real time through alarms or other communication systems.

Claim 7

The real-time performance monitoring system of claim 6,

wherein the monitor displays a visualization of data representing said at least one of historical tracking, prediction or actions related to the metrics being monitored.

Claim 9

The real-time performance monitoring system of claim 1,

wherein the monitor concurrently displays at least one dynamic geographic display and a plurality of data or text panels for at least one of monitoring, tracking, prediction, actions or mitigations.

Claim 12

The real-time performance monitoring system of claim 1,

wherein an operator of at least one of the monitor computer or said at least one display computer can define an application to monitor metrics, which are related to the electric power grid at the local level, control area level, or regional level covering a wide area, which the operator desires to monitor.

Claim 19

The real-time performance monitoring system of claim 1,

wherein the monitor computer monitors proximity to potential system faults, and said at least one display computer graphically represents the proximity to potential system faults on the monitor.

Claim 24

The real-time performance monitoring system of claim 1:

wherein the reliability metrics, power grid operations metrics, generation metrics, transmission metrics, suppliers metrics, grid infrastructure security metrics or markets metrics for the electric power grid are monitored across a wide area covering multiple control areas and utilities;

wherein each of the plurality of grid portions includes a network of high voltage transmission lines and generators interconnected to the

network that is spread out over the multiple control areas across the wide area;

wherein the plurality of grid portions are subject to power blackouts that spread or cascade over the wide area; and

wherein the operator is a reliability coordinator having responsibility to:

monitor the power grid metrics over the wide area for reliability management; and

prevent power blackouts that spread or cascade over the wide area.

U.S. Patent No. 8,060,259

Claim 1

A wide-area real-time performance monitoring system for monitoring and assessing dynamic stability of an electric power grid, the system comprising:

a monitor computer including an interface for receiving a plurality of data streams, each data stream comprising sub-second, time stamped synchronized phasor measurements wherein the measurements in each stream are collected at geographically distinct points over a wide area of the grid;

wherein the monitor computer monitors metrics including at least one of reliability metrics, power grid operations metrics, generation metrics, transmission metrics, suppliers metrics, grid infrastructure security metrics or market metrics over a wide area of the electric power grid, wherein the wide area comprises at least two distinct entities selected from the group consisting of transmission companies, utilities, and regional reliability coordinators;

wherein the monitor computer derives in real-time from the plurality of data streams from the at least two distinct entities selected from the group consisting of transmission companies, utilities, and regional reliability coordinators, one or more dynamic stability metrics including phase angles, damping, oscillation modes, and sensitivities for dynamics monitoring using phasor measurements in which the stability metrics are indicative of grid stress and/or instability, over the wide area; and

wherein the monitor computer is configured to supply at least two different categories of data concern the metrics to a graphical user interface coupled to the monitor computer for concurrently displaying the at least two different categories of data concerning the metrics,

wherein the categories of data include monitoring data, tracking data, historical data, prediction data, and summary data,

wherein the graphical user interface provides concurrent visualization of a plurality of metrics directed to a wide geographic area of the grid covering at least two distinct entities selected from the group

consisting of transmission companies, utilities, and regional reliability coordinators, and

wherein the computer accumulates and updates wide area dynamic performance metrics in real time as to wide area and local area portions of the grid.

Claim 2 (not asserted)

The performance monitoring system of claim 1,

wherein the monitor computer analyzes the monitored metrics and the graphical user interface displays results of analyzing the metrics.

Claim 5

The performance monitoring system of claim 2,

wherein the monitor computer is configured to transfer the results of the analysis to another computer system for display, further analysis, or as an input for another calculation.

Claim 17 (not asserted)

A method of performing wide area real time monitoring and assessment of dynamic stability of an electric power grid comprising:

receiving a plurality of data streams, each data stream comprising sub-second, time stamped synchronized phasor measurements wherein the measurements in each stream are collected at geographically distinct points over a wide area of the grid comprising at least two distinct entities selected from the group consisting of transmission companies, utility companies, and regional reliability coordinators;

monitoring dynamic stability metrics including phase angles, damping, oscillation modes, and sensitivities over the wide area of the electric power grid;

deriving in real-time from the plurality of data streams one or more stability metrics for dynamics monitoring using phasor measurements which are indicative of grid stress and/or instability;

updating the monitored metrics in real time;

concurrently displaying in graphical form at least two different categories of data concerning the metrics, wherein the categories are selected from a group consisting of monitoring data, tracking data, historical data, prediction data, and summary data;

updating the displayed data in real time;

analyzing the displayed data;

providing summary information concerning real time performance of the electric power grid; and

storing the data in real time for replay and review to perform power grid system performance assessment, event diagnostics, root cause

analysis of events and situational assessment of dynamic stability of the electric power grid in real time.

Claim 18

The method of claim 17 further comprising

identifying monitored data of a portion of the electric power grid that crosses a threshold.

Claim 21

The method of claim 17, further comprising

drilling down or zooming in and viewing data across the metrics and across the geographically distinct points.

Claim 22 (not asserted)

A wide area real-time dynamics monitoring system for assessing dynamic stability of an electric power grid, the system comprising:

a monitor computer for receiving a plurality of data streams, each data stream comprising sub-second, time stamped synchronized phasor measurements wherein the measurements in each stream are collected at geographically distinct points over a wide area of the grid, the plurality of data streams being received by the monitor computer from third party utilities or transmission companies that provide the data, wherein the wide area comprises at least two distinct entities selected from the group consisting of transmission companies, utilities, and regional reliability coordinators,

wherein the monitor computer derives in real-time from the plurality of data streams from the at least two distinct entities one or more dynamic stability metrics including phase angles, damping, oscillation modes, and sensitivities for dynamics monitoring using phasor measurements in which the stability metrics are indicative of grid stress and instability, over the wide area, and

wherein the derived metrics include at least one of reactive reserve margin, power transfer angle, voltage/volt-ampere reactive (VAR), frequency response, sensitivities and/or combinations thereof;

a database to store the measurements and derived metrics; and

a display operatively coupled to the monitor computer and database for visualization of information relating to the plurality of the measurements and derived metrics relevant to the assessment of the

real-time dynamic stability of wide area and local area portions of the grid.

Claim 38

The wide area real-time dynamics monitoring system of claim 22,

wherein an operator of the monitor computer can define an application to monitor the derived metrics, which are related to the electric power grid at a local level, control area level, or regional level covering the wide area that the operator desires to monitor.

Claim 49

The wide area real-time dynamics monitoring system of claim 22,

wherein the monitor computer tracks, identifies and saves data on defined or abnormal operating conditions in a database, and the display provides visualization of the abnormal operating conditions.

Claim 53

The wide area real-time dynamics monitoring system of claim 22,

wherein the monitor computer is configured to store the data in real time for replay and review to perform power grid system performance assessment, event diagnostics, root cause analysis of events and situational assessment of dynamic stability of the electric power grid in real time.

U.S. Patent No. 8,401,710

Claim 9

A wide-area real-time performance monitoring system for collecting, storing and analyzing event data and analysis of events on an interconnected electric power grid in real time over a wide area and automatically analyzing the events on the interconnected electric power grid, the system comprising:

a monitor computer including an interface for receiving a plurality of data streams, each of data streams comprising sub-second, time stamped synchronized phasor measurements wherein the measurements in each stream are collected in real time at geographically distinct points over the wide area of the interconnected electric power grid, the wide area comprising at least two elements from among control areas, transmission companies,

utilities, regional reliability coordinators, and reliability jurisdictions;

a plurality of interfaces to other power system data sources, the other power system data sources comprising at least one of transmission maps, power plant locations, EMS/SCADA systems;

a plurality of interfaces to non-grid data sources;

a database configured to store the phasor measurements and a plurality of derived metrics; and

a display coupled to the monitor computer and the database for visualization of information relating to the plurality of the phasor measurements and the derived metrics relevant to assessing the real-time dynamic stability of wide area and local area portions of the interconnected electric power grid,

wherein the monitor computer is configured to monitor metrics, the metrics comprising at least one of reliability metrics, power grid operations metrics, generation metrics, transmission metrics, suppliers metrics, grid infrastructure security metrics, and market metrics over the wide area of the interconnected electric power grid,

wherein the monitor computer is configured to detect events in real-time from the plurality of data streams from the wide area,

wherein the monitor computer is configured to execute event detection logic, the event detection logic being configured to detect and analyze an event based on at least one of limits, sensitivities, and rates of change for one or more measurements from the data streams and dynamic stability metrics derived from analysis of the measurements from the data streams including at least one of frequency instability, voltages, power flows, phase angles, damping, and oscillation modes, derived from the phasor measurements and the other power system data sources in which the metrics are indicative of events, grid stress and/or grid instability, over the wide area, and

wherein the metrics associated with a detected event comprise include at least one of time of event, location of event, type of event, magnitude of event, and one or more key event related metrics such as frequency, delta frequency, voltage drop, reactive reserve margin, power transfer angle, voltage/volt-ampere reactive (VAR), frequency response, sensitivities and/or combinations thereof.

Claim 12

A method of detecting events on an interconnected electric power grid in real time over a wide area and automatically analyzing the events on the interconnected electric power grid, the method comprising:

receiving a plurality of data streams, each of the data streams comprising sub-second, time stamped synchronized phasor measurements wherein the measurements in each stream are collected in real time at geographically distinct points over the wide

area of the interconnected electric power grid, the wide area comprising at least two elements from among control areas, transmission companies, utilities, regional reliability coordinators, and reliability jurisdictions;

receiving data from other power system data sources, the other power system data sources comprising at least one of transmission maps, power plant locations, EMS/SCADA systems;

receiving data from a plurality of non-grid data sources;

detecting and analyzing events in real-time from the plurality of data streams from the wide area based on at least one of limits, sensitivities and rates of change for one or more measurements from the data streams and dynamic stability metrics derived from analysis of the measurements from the data streams including at least one of frequency instability, voltages, power flows, phase angles, damping, and oscillation modes, derived from the phasor measurements and the other power system data sources in which the metrics are indicative of events, grid stress, and/or grid instability, over the wide area;

displaying the event analysis results and diagnoses of events and associated ones of the metrics from different categories of data and the derived metrics in visuals, tables, charts, or combinations thereof, the data comprising at least one of monitoring data, tracking data, historical data, prediction data, and summary data;

displaying concurrent visualization of measurements from the data streams and the dynamic stability metrics directed to the wide area of the interconnected electric power grid;

accumulating and updating the measurements from the data streams and the dynamic stability metrics, grid data, and non-grid data in real time as to wide area and local area portions of the interconnected electric power grid; and

deriving a composite indicator of reliability that is an indicator of power grid vulnerability and is derived from a combination of one or more real time measurements or computations of measurements from the data streams and the dynamic stability metrics covering the wide area as well as non-power grid data received from the non-grid data source.

Claim 17

The method of claim 12, further comprising

enabling a user to drill down and visualize the metrics displayed on a graphical user interface at various geographical resolutions ranging from wide-area to local-area.