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June 20, 2023

Via Electronic Filing

Shabbir Hamid
Attorney Advisor, Cybersecurity and Communications Reliability Division
Public Safety and Homeland Security Bureau
Federal Communications Commission
45 L Street, NE
Washington, DC 20554

Re: Notice of Ex Parte Letter, PS Docket No. 15-80, PS Docket No. 13-75 and ET Docket No. 04-35

Dear Mr. Hamid,

On June 15, 2023, at your request, I participated in a conference call with several members of the Public Safety and Homeland Security Bureau regarding the above numbered dockets.[1] On the call from the Division were:

- Shabbir Hammid - Attorney Advisor
- James Wiley - Deputy Chief
- Erika Olsen – Sr. Legal Counsel to Chief of the Public Safety and Homeland Security Bureau
- Bill Kang - Deputy Division Chief
- Ryan Hedgpeth - Telecommunications Specialist
- Scott Cinnamon - Attorney Advisor

The call covered many topics relating to the detection and reporting of 911 calls that do not go through. The staff on the call asked that FailSafe Communications, Inc. ("FailSafe") provide additional information in this *ex parte* letter. This letter summarizes the call and responds to those requests.

[1] Amendments to Part 4 of the Commission's Rules Concerning Disruptions to Communications; Improving 911 Reliability; New Part 4 of Commission's Rules Concerning Disruptions to Communications, Second Report and Order, FCC No. 22-88, PS Docket No. 15-80, PS Docket No. 13-75, ET Docket No. 04-35 (rel. Nov. 18, 2022) ("Second Report and Order").

Introduction

At the outset of our call, I likened FailSafe to the plot of those movies where the old guys are called out of retirement to help solve some problem that involves antiquated technology. As for myself, I graduated from law school in 1975 and worked for the Oklahoma Corporation Commission, the Texas Public Utility Commission (twice), General Counsel for a large telecommunications company and "of counsel" for what was at the time the largest law firm in Austin, Texas.[2] I thought of myself as pretty much retired until I received a call from FailSafe's founder and TeleSentient™ inventor Leo A. Wrobel.

It is Mr. Wrobel's decades of experience that have led to creation of FailSafe. Mr. Wrobel is a widely published expert in telecommunications and business continuity, as well as a former Mayor. As such he has been aware of the issue of emergency calls not getting through for many years.[3] This is not the first time he has proposed re-purposing traditional telecom services to meet the need for business continuity.

In 2000 the City of Red Oak, Texas implemented a disaster recovery system of Wrobel's design when their City Hall burned to the ground. He also designed a similar backup system for American Airlines around that same time. That system allowed the airline to redirect local calls intended for their Dallas reservation office to Raleigh, NC when experiencing service disruptions due to severe weather events. The system could be activated instantly from the living room of the call center manager. All told, Leo has consulted for or designed business continuity plans and systems for over 100 organizations.[4]

In 2016 Wrobel conceived of another system, this time one that would not only help a single client, but our nation as a whole. His idea was that actionable emergency data could be derived from intelligent telecommunications signaling networks. When a major event occurs, whether it is a natural disaster, facility failure, or in mass calling events such as a school shooting, those events are invariably reflected in the calling patterns of wireless and landline users. When those calling anomalies are correlated with cause data from other reliable sources, the results can be astonishing.

This concept, combined with interest from an oil company client of Wrobel's, led to his filing of a patent around 2018, and a second patent around 2020.[5] They have both since been approved. Wrobel eventually trade named the patents "Telesentient"™ as in a s*entient* being.[6]

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[2] *See* https://www.telesentient.net/our-founders-click-for-detailed-biographies/eddie-m-pope

[3] His 40+ years date back to the 1970's when Sergeant Leo A. Wrobel began his long career with some of the most critical and sophisticated emergency communications systems of the time, in the U.S. Air Force Communications Service.

[4] Mr. Wrobel has consulted with or designed recovery systems for includes ACS, American Airlines, AT&T Bell Labs, Bank Of California, Bell South, Con Edison, City Of Dallas, City Of Tulsa, Dana Corporation, Department Of Defense, EDS, Ericcson, Exxon, FERC, Fidelity Investments, Federal Bureau Labor Statistics, GE, Greenway Communications, GTE, LOGTEL Communications (Israel) NORTHRUP, Occidental PG&E, Pacific Disaster Center, Pacific Healthcare, Proxona, PS Lightwave, Reasnor Telephone, QWEST, Reliance Electric, Southern Methodist University, State Of Hawaii, Tel Aviv Stock Exchange, Teleira, TELLABS, Texas Workforce Commission, Texas Department Of Public Safety, Texas Instruments, United Health Care, USAA, WEYERHAUSER, and others. More information on Mr. Wrobel can be found at https://www.telesentient.net/our-founders-click-for-detailed-biographies/leo-a-wrobel

[5] US Patent No. 10,812,663 B2 and 11,582,352 B2 relating to deriving new information by combining signaling network data with external databases. FailSafe recently purchased the rights to US Patent 10,667,199 which relates to systems and methods for improving routing of communications to emergency services. Attachment "A" contains a diagram from one of the patents that may be helpful to the Commission's engineering staff.

[6] Sentient (adjective) **'**able to perceive or feel things' as in *sentient* of the danger posed by an approaching hurricane.

Mr. Wrobel emailed me after the Second Report and Order came out in November of 2022 and asked me to analyze it. We realized that the Second Report and Order created a greater need for the solutions that Mr. Wrobel had developed. Since January of this year it has been "all hands on deck" at FailSafe.

FailSafe does not market any finished products. FailSafe's contract provides a licensee the use of our patents and the necessary consulting to select the vendors and the technology that best fits the licensee. Stated another way, the implementation strategies of industry participants like T-Mobile, Verizon, Intrado, Everbridge, On-Solve, NGA911, Aureon, or even the FCC themselves, are all different. FailSafe clients license our technology to build *their* products based on *their* diverse and unique needs.

FailSafe has brought together a Board of Directors composed of some of the most proven and esteemed talent in the country.[7] These men and women, many in their sixties or older, have the proven track records FailSafe needs to bring this solution to the marketplace. All are energized at the prospect of leaving a legacy that involves saving lives. In short, FailSafe is an inclusive, veteran-owned, company, formed by some of the distinguished names in the industry, and united by a common goal and dream.

The Technology

On the call, I explained the basic technology being used by FailSafe is Telesentient™ and that it relies on technologies such as Signaling System 7 ("SS7") various forms of SIP signaling networks, and other technologies, which underlie the voice network. FailSafe's patents obviously cover more than just the legacy SS7 network, but for simplicity I use the terms like "SS7" or IAM in my descriptions. These should be understood to describe all equivalent kinds of signaling technology as well.

As the FCC is aware, signaling networks operate independently of the networks that carry calls. There are various of kinds of signaling networks in use today, but their common purpose is that they are the intelligent networks that tell voice networks what is going on and what to do.[8] SS7 was among the first of these technologies introduced in the 1970s. It captures call detail as a call is set up, before even establishing a voice circuit. There are in fact 128 "cause codes" in SS7 that impart every detail of a call. Our invention re-purposes this technology in order to pinpoint issues and determine what caused them. Setting up a "trigger" using readily available equipment and appropriate back-end services allows the capability to send an automated alert that any call, including a 911 call, did not go through.

The first step is to locate the caller. In the SS7 world, *point codes* exist that correspond to specific switches and equipment in the public switched telephone network. Those correspond to specific vertical and horizontal (V&H) coordinates for that equipment. V&H coordinates in turn correspond to specific serving wire centers or wireless serving offices. Those serving offices can identify the location of callers by various means and depending on the technology used.

TeleSentient™ correlates signaling network data with other available information to pinpoint callers in trouble. For example, it's possible for our licensees to see the caller's address using another database, the Local Exchange Routing Guide ("LERG"). While not always a perfect solution, it can be a valuable check-and-balance for landline customers.

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[7] *See* https://www.telesentient.net/our-founders-click-for-detailed-biographies

[8] Out-of-Band Signaling today encompass newer technologies such as Diameter and other embodiments in SIP networks.

Consider, for example, the proliferation of competitive 911 companies like Intrado and others, where the 911 operator may not be in the geographic area or even same state as the caller. In such a case, if a database erroneously tells the provider to send a Dallas 911 caller to a PSAP in Alaska, a quick database dip on the LERG would alert them immediately to the error.

In a second embodiment, TeleSentient™ can be used to set up a continuous "sweep" of 10-digit *non*-emergency numbers for an area, (police, fire, etc). When a condition shows "all circuits busy" cause codes from those numbers for a long time, this can be an indicator of trouble, since 911 calls often "overflow" to non-emergency numbers. Such an indication could be circumstantial evidence of an overflow condition on the primary 911 lines and merit further investigation.

With regard to "sweeps" there are other uses as well. Companies that market 911 and disaster recovery services might have more than a passing interest in where the disasters are, so they can direct sales forces to areas where potential customers are in need right now of their services. Agencies like FEMA will want get ahead of issues such as whether to send satellite phones or cell phones to disaster areas.

Finally, TeleSentient™ can be visualized. Unusual network activity can be displayed by our vendors as dots on a map, such as a National Weather Service map on TV that shows a severe thunderstorm, along with all associated callers to 911 in the affected area. We offer a recent and related example below.

Recent Developments Since Our Call

Shortly after our call, I requested TeleSentient™ data from our staff specifically regarding Oklahoma central offices. There were two reasons. First I wanted to be as responsive as possible to your requests and questions. Second, I live in Oklahoma and major thunder storms were threatening the state that day.

FailSafe staff immediately reached out to one of its prospective GIS vendors and supplied that vendor with central office data for Oklahoma. That vendor had no previous notice of this request and their I.T. Director was on vacation. Nonetheless, in two hours that vendor produced a basic map of all central offices in Oklahoma, correlated with information about weather in the area. With some limitations due to time to prepare, the graphic has the ability to drill down to street level.

This vendor has asked that their response to FailSafe be held confidential for now. FailSafe can provide the data used and the images produced to FCC staff on a confidential basis if requested. The particular vendor we selected receives federal funding and confirmed by phone that they have the capability to scale up to a nationwide implementation.

Commensurate with the activity above, I requested activation of a live signaling network probe of all call activity in the 405 (Oklahoma City) area code.[9] While this activity will not be complete in time for this ex-parte filing, we believe we can provide the results to FCC staff once our collection and analysis is complete. [10]

I remain mindful of the staff's request for me to share a demonstration of TeleSentient.™ We are working with our vendors on a real-time demonstration and I will file a follow-up letter when we are ready to make a presentation to the staff.

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[9] This kind of testing is non-intrusive and involves the signaling network ONLY. It does not make calls. It simply queries a selected area by NPA/NXX and records signaling cause codes reflecting network conditions.

[10] It is our understanding that the FCC has its own internal GIS experts. We would be happy to support a limited trial with that group upon request to evaluate displaying TeleSentient™ metadata on their systems. This could be conducted with them or an outside GIS provider since FailSafe only offers licenses and data, not finished visualization products.

Specific FCC Staff Questions

The staff on the call asked for additional information about aspects of Telesentient™.

How does the originating company know the cause of the outage?

The staff asked me to discuss how the originating company would know the cause of the outage. They posed three scenarios:

- **The call problem is on the originating side - *e.g.* a cable cut**

Telesentient™ is obviously not the only way to detect a cable cut. An alarm bell may ring in a central office, but not always. The idea behind TeleSentient™ is to know *who is affected* by that cable cut and *where they are.* It also depends on exactly which cable or fiber is cut.

If the cable or fiber is the one that directly feeds the 911 center, any caller to that 911 center (with some technical limitations such as CAS trunks, which would have to be modified to use some kind of out-of-band signaling) would send an IAM message (or SIP equivalent) requesting a call to be established to 911. In a normal call an ACP message is sent back to the caller's switch and only then is the voice path set up. In a cable cut, no ACP message would come back. The caller would receive a fast busy, recording, or dead air. In the case where the cut is on the cable or fiber serving that caller (or their cell tower is down) the caller may be out of luck and isolated from 911. TeleSentient™ is not the answer to every cable cut, but it provides much more actionable data than a bell in a central office.

- **The call does not get correctly routed because of a database error**

TeleSentient™ will not *prevent* a database error, although it can be a useful check and balance, such as comparing a database with the LERG on a near real time basis. A caller that shows in the LERG to be in Dallas with routing instructions in the database wants to send them to San Antonio for example might be grounds for further investigation.[11] Bottom line, databases are the responsibility of our licensee, although presumably visibility of related issues or indicators might be improved with TeleSentient.™

- **The terminating PSAP is having an outage.**

It depends on what kind of outage, and the configuration of the PSAP. If the phones are still in service at the PSAP but their consoles are down, TeleSentient™ would not spot that problem, except by extrapolation. In such a case the phone would ring and ring and the caller would eventually give up, or hang up and call again. TeleSentient™ could be configured to spot activity like this by using triggers that are activated based on call ring duration before answer, repeat calls, or other metrics. The occasion a couple of years ago in Dallas comes to mind where a problem with the cell phones of a major wireless provider ran amok, and an eight month old baby died. TeleSentient™ would have spotted that kind of problem if the correct triggers were set.

The next question was what does one of our licensees need to do to get this to work?

It depends on the licensee. Our partner Tekno Telecom has equipment installed in thousands of carriers worldwide. If a prospective TeleSentient™ user is already a Tekno customer, the process is simplified. For non-Tekno prospects, those users may be employing any number of signaling technologies. Let's consider first a customer with two 64Kb "A Links" in a traditional SS7 environment since a lot of small Independent Telephone Companies still use this technology. FailSafe is connected in to one right now.

[11] FailSafe is in preliminary discussion with a firm that advertises advanced systems to identify the correct PSAP for callers.

We use an Engage Communications protocol converter to take the two (TDM) T1 circuits that carry the two SS7 links and tunnel them in to a Sip connection that is routed over the Internet. At the far end, another Engage box is installed at Tekno in Chicago where it converts back to the original SS7 TDM connection. At that point Tekno can install whatever solution the customer wants, such as a Tekno box that sends an email every time a trigger is activated.

Other customers may use a Sigtran link. This kind of signaling already routes over the Internet. In that case the carrier provides an I/p address that corresponds to their signaling network, usually in a DCS (Digital Cross System) system or equivalent. Setting up a user in this manner is nearly instantaneous.

The engineers asked: what will be the capacity of Telesentient? Will there be latency? Will the latency correspond to the capacity? What do we have to see as far as switch data? Are we behind the firewall?

There is nearly zero latency. If there was any latency the calls you place today would experience long setup times. They don't. FailSafe will consult with our licensees to create more than enough capacity to spot trouble. There is no firewall in the SS7 or signaling networks. If there was such a firewall, calls would be blocked. FailSafe collects and pre-process signaling network data and supplies it to licensees in Excel or CSV format. The resulting spreadsheet, as an example, might look something like this.

V	H	Map Grid Squares	Location
2207	11384	64.8383 -147.7024	(Fairbanks,Alaska)
3961	1370	44.3134 -69.7775	(Augusta,Maine)
5623	5794	47.8427 -100.6696	(Butte,NorthDakota)
7010	2710	36.1593 -86.7734	(Nashville,Tennessee)
8351	52725	7746 -80.1903	(Miami,Florida)
9004	3995	30.2693 -97.7325	(Austin,Texas)
9476	7620	32.6749 -117.1077	(NationalCity,California)
11591	15609	21.3142 -157.8634	(Honolulu,Hawaii)
7944	3044	17.7467 -64.7082	(StCroix,VirginIslands)
..... and so on...			

File Size and Storage Requirements for the Licensee

File storage requirements are minimal because SS7 queries are small. In an RFP we sent out last year to potential partners we made these assumptions: Standard equipment would be used to poll 17,000 telephone serving offices in the United States every three (3) minutes. (One *sweep*) Each point code would return 16 bits of data in hexadecimal format. Data would be recorded to an Excel spreadsheet after converting it from hex code to V&H coordinates. (If the customer wanted dots on a map an additional step would be added to convert to Lat/Lon and subsequent addition of name and location from databases like the LERG or NEAD must also be allowed for.[12] Results as follow:

- 17,000 end offices
- 40 bits per transaction (with overhead)
- 20 times per hour
- 24 hours a day

17,000x40=680,000 x 20 sweeps /hr = 13,600,000 bits, x 24 hours = 326 Mb / day.

Note this is a 326 *Megabyte* (not Gigabyte) file.[13]

[12] NEAD is National Emergency Number Database.

[13] This file size is the approximate equivalent of a two minute iPhone video.

Since the RFP above we have conducted live tests. We recently converted V&H data and mapped the Lat/Lon for 44,000 wire centers in the North American Numbering Plan, including Guam, USVI, Canada etc, in a few hours. We conclude that a sweep of all phones in North America (or system wide for a major telco) every few minutes is technically within reach.

The next concern raised was whether our technology would work as the world transits to IP.

Yes, our technology works in an IP environment. We speak a lot in terms of SS7 because the average age of our founders is 70 and it's a technology we all understand. SS7 tends to be associated with landlines. Even so, as long as there is a single landline left on the planet, there will be a gateway to convert SS7 to Sip, Diameter, or whatever the prevailing signaling technology is at the time. This strategy allows many equipment providers that make equipment that they believed was nearing the end of its shelf life to find a new purpose.

The Staff asked for an estimate of when a demo might be available.

As noted above, we are working diligently with our vendors to produce a demo. I will file a supplement to this letter when the demo is available and will seek to have an in-person meeting at that time.

The Staff asked about the anticipated cost to the licensee.

As I explained, on the call, we are still noodling pricing. After consultation with our business development people I have discovered that a package for small Independent Telephone Companies (ITCOs) is actually envisioned for release in 4Q 2023. The web based option is intended for ITCOs with less than 1000 lines. It will be priced as a turn key option for automated reports to the FCC and the PSAP in the range of $2000 a year plus an undetermined per-transaction fee. [14]

You will also recall that on our call I also mentioned a "$1000 per PSAP" price. I received clarification on this figure. It is also a price under consideration, but it represents what what a licensee might charge to one of *their* PSAP customers. (*e.g.* T-Mobile, Verizon, Intrado, Everbridge, On-Solve, NGA911, Aureon, etc.) Secondly, we assume that, unlike ITCOs, companies like the ones we just mentioned will all want ICB pricing. Thirdly, a carrier customer of FailSafe may price the service and the usage charges any way they wish since it's impossible for FailSafe to tell what kind of added value they might add to our license. Live operators, enhanced call routing schemes, upgraded reporting, visualization, and other services come to mind. TeleSentient™ can be integrated into any value added platform that makes sense. Finally, decisions as to whether to price based on usage, per-call, flat rating, combination with other services, and how to collect for those services (direct charge, surcharge, 911 fee *etc*) belong to the TeleSentient™ licensee, not FailSafe.

I hope these clarifications help. Again I need to emphasize that these are *preliminary* numbers and that they are subject to revision as we test the marketplace and determine which carrier customers are responsive to our services. I will supplement this letter when we have a definitive pricing model. We anticipate expressions of interest from PSAPs, landline carriers and mobile carriers. I will also supplement this letter as that interest develops. You can presently view these three options in the "More Information" section of www.telesentient.net. You are welcome to leave your comments and question there as well. We even have a separate box for attorneys!

[14] This date may be slightly earlier or slightly later. We are engaging with the back end system support providers now and delivery of this first option depends in part on those providers. For this reason pricing may also be higher or lower.

Conclusion

FailSafe Board Member Philip N. Diehl, (former Director of Telephone Regulation for the State of Texas, and former Chief of Staff, U. S. Treasury Department) recently characterized 911 issues to us as:

> *"An issue that is entirely foreseeable, and therefore an unnecessary risk to a provider. It's a risk management issue that any well-managed communications provider should address in their own interest."*

Our inventor and founder Leo A. Wrobel takes it a step further, and adds,

> *"There have been fines. There have been deaths. There has been the introduction of "blue screens" into an emergency services environment that in the TDM world offered "four nines" reliability. And while Next Generation 911 will bring exciting new capabilities, some bitter medicine may have to be swallowed during the transition. This transition need not be a painful one if the industry stays vigilant and does not overlook helpful safeguards such as TeleSentient.™"*

On behalf of the Board of Directors of FailSafe Communications and myself, we believe strongly enough in the promise of TeleSentient™ to lure most of us out of comfortable semi-retirements to bring this idea to life. We are inspired by the Commission's desire to make sure every 911 call is treated as a high priority. We admire the staff whose work is necessary to create this lasting legacy. "Society grows great when old men plant trees whose shade they know they shall never sit in."[15] We look forward to more interaction with the Commission.

Sincerely,

/s Eddie M. Pope

Eddie M. Pope, General Counsel
FailSafe Communications, Inc.

[15] Anonymous Greek proverb.

ATTACHMENT A

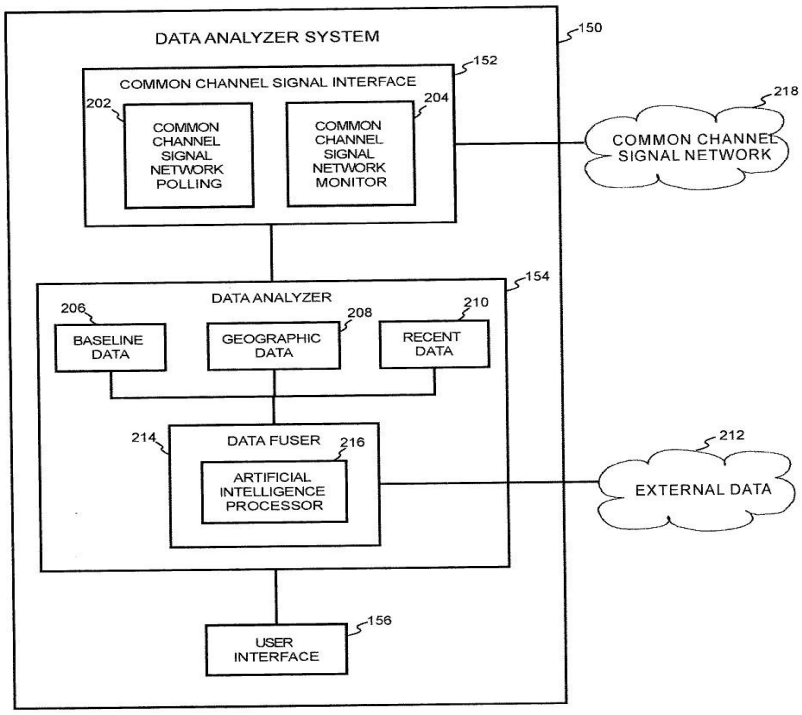

Fig. 2

Our patent envisions the eventual inclusion of an Artificial Intelligence (AI) processor. Although not necessary for the services and licenses contained in this document, the management of FailSafe considers the breathtaking developments in AI to bode well for the future of TeleSentient.™

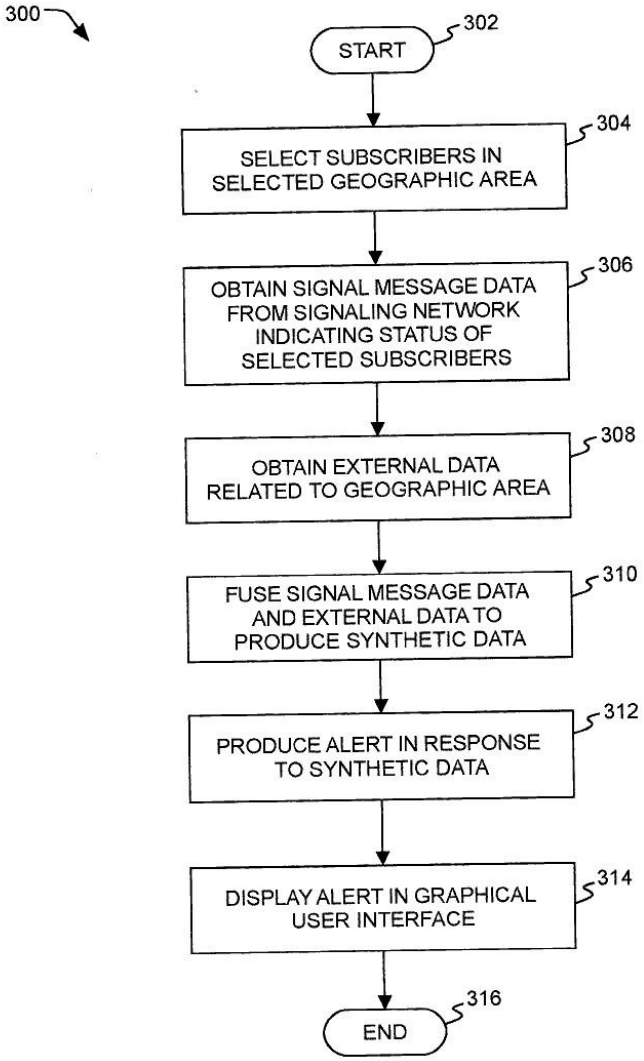
300
START
302
SELECT SUBSCRIBERS IN SELECTED GEOGRAPHIC AREA
304
OBTAIN SIGNAL MESSAGE DATA FROM SIGNALING NETWORK INDICATING STATUS OF SELECTED SUBSCRIBERS
306
OBTAIN EXTERNAL DATA RELATED TO GEOGRAPHIC AREA
308
FUSE SIGNAL MESSAGE DATA AND EXTERNAL DATA TO PRODUCE SYNTHETIC DATA
310
PRODUCE ALERT IN RESPONSE TO SYNTHETIC DATA
312
DISPLAY ALERT IN GRAPHICAL USER INTERFACE
314
END
316

Fig. 3