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EXAMINER	
HARRIS, LAURI D	

ART UNIT	PAPER NUMBER
4177	

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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)
	11/201,637	BENYASSINE ET AL.
	Examiner	**Art Unit**
	LAURI HARRIS	4177

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE _3_ MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on _10 August 2005_.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) _1-24_ is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) _1-24_ is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on _10 August 2005_ is/are: a)☐ accepted or b)☒ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Drawings

1. The drawings are objected to because Figure 2, Item 232 is not described within the specification. Corrected drawing sheets in compliance with 37 CFR 1.121(d) are required in reply to the Office action to avoid abandonment of the application. Any amended replacement drawing sheet should include all of the figures appearing on the immediate prior version of the sheet, even if only one figure is being amended. The figure or figure number of an amended drawing should not be labeled as “amended.” If a drawing figure is to be canceled, the appropriate figure must be removed from the replacement sheet, and where necessary, the remaining figures must be renumbered and appropriate changes made to the brief description of the several views of the drawings for consistency. Additional replacement sheets may be necessary to show the renumbering of the remaining figures. Each drawing sheet submitted after the filing date of an application must be labeled in the top margin as either “Replacement Sheet” or “New Sheet” pursuant to 37 CFR 1.121(d). If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

Claim Rejections - 35 USC § 101

35 U.S.C. 101 reads as follows:

> 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.

2. Claims 1-24 are rejected under 35 U.S.C. 101 because the claimed invention is directed to non-statutory subject matter. These claims include a judicial exception in the form of an abstract idea for a filter adaptation or an acoustic echo cancellation. Neither a physical transformation nor any useful, concrete and tangible result is found as no real world use is found as the process recited in these claims are not associated to any physical devices. For the purpose of examination, the examiner assumes the claims preamble read, "… a software acoustic echo canceller system in a digital filter medium within a telecommunications device". Appropriate correction/clarification requested.

Claim Rejections - 35 USC § 112

3. The following is a quotation of the first paragraph of 35 U.S.C. 112:

> The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

4. Claims 1-24 are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the enablement requirement. The claim(s) contains subject matter, which was not described in the specification in such a way as to enable one skilled in the art to which it pertains, or with which it is most nearly connected, to make and/or use the invention. One of ordinary skill in the art would need circuitry or the transform used for filtering to make and/or use the invention. None is disclosed.

5. The following is a quotation of the second paragraph of 35 U.S.C. 112:

> The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter, which the applicant regards as his invention.

6. Claims 1-24 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. Applicant fails to particularly point out and distinctly claim the transforms used in filter adaptation.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

7. Claims 1-4, 7-16, and 19-24 are rejected under 35 U.S.C. 103(a) as being unpatentable over Ericksson US Patent No. 6,219,418 in view of Roy US Patent No. 5,347,177.

Claim 1: A method for use by an echo canceller to detect an echo path change and adjust to said echo path change, said method comprising: (Ericksson, column 3, lines 26-34; During double-talk the coefficients that were transferred to the programmable foreground filter 18 just before double-—talk situation occurred are kept for echo cancellation during the double talk-period. Once the double-talk situation no longer exists and the adaptive background filter 12 is determined to give better performance, filter coefficients are once again transferred from filter 12 to filter 18.[detect an echo path change and adjust to said echo path change])

determining a first bulk delay of an echo signal using a foreground adaptive filter, said foreground adaptive filter being a SPARSE filter; (Roy, column 14, lines 19-37; For optimum performance, the IIR section should be continuous (i.e., have contiguous non-zero taps) so that it can cancel all post ghosts within the span of the filter. This necessitates an extremely long and expensive IIR section for practical ranges further, cancellation of a few prominent post ghosts leads to the greatest improvement in visual quality. This latter reasoning leads to the implementation of the IIR section as a sparse filter**,** consisting of six sections each having eight taps. Each section is positioned at a prominent post-ghost location using a programmable bulk delay determined by examining the peaks of channel impulse response, thereby allowing attenuation of the six strongest post-ghosts by this method.)

configuring said foreground adaptive filter to an open-loop mode; (Ericksson, Figure 4, Item 18; the foreground filter is configured in an open-loop mode)

canceling said echo signal based on said first bulk delay using said foreground adaptive filter; (Roy, column 14, lines 19-37; Implementation of the IIR section as a sparse filter**,** consisting of six sections each having eight taps. Each section is positioned at a prominent post-ghost location using a programmable bulk delay determined by examining the peaks of channel impulse response, thereby allowing attenuation of the six strongest post-ghosts by this method.)

determining a second bulk delay of said echo signal using a background adaptive filter, said background adaptive filter being a SPARSE filter; (It is the Examiners position that multiple bulk delays could be calculated based on the number of reflective paths in the communications environment; see bulk delay rejection above)

configuring said foreground adaptive filter to a closed-loop mode and continuing to cancel said echo signal based on said first bulk delay; (Ericksson, Figure 4, one filter is open-loop the other is closed-loop. It would have been obvious to one skilled in the art at the time of the invention to try reconfiguring the foreground filter back and forth between open and closed-loop mode since there are only four permutations both filters in closed-loop, both filters in open-loop, one in open-loop the other in closed-loop or vice versa. In addition, the copying of coefficients from one filter to the other provides this simulation of changing to from open-loop to closed-loop configuration.)

configuring said background adaptive filter to said open-loop mode; (Ericksson, Figure 4, one filter is open loop the other is closed-loop. It would have been obvious to one skilled in the art at the time of the invention to try reconfiguring the foreground filter back and forth between open and closed-loop mode since there are only four permutations both filters in closed-loop, both filters in open-loop, one in open-loop the other in closed-loop or vice versa.)

measuring an echo cancellation performance of said foreground adaptive filter and an echo cancellation performance of said background adaptive filter; and (Ericksson, columns 3 and 4, lines 50-67 and 1-17; calculation of an ERLE)

changing parameters of said foreground adaptive filter if said measuring determines that said echo cancellation performance of said background adaptive filter is better than said echo cancellation performance of said foreground adaptive filter. (Ericksson, column 3, lines 20-25; the coefficients from the adaptive background filter 12 are transferred to the programmable foreground filter 18 whenever the adaptive background filter 12 is considered better than the programmable foreground filter 18.)

Ericksson teaches all the limitations of claim 1 above except bulk delay and SPARSE/down sampling. Roy, a teaching within analogous art, teaches the use of bulk delay and sparse filter adaptation. It would have been obvious to one skilled in the art at the time of the invention to modify Ericksson by Roy's bulk delay and sparse filtering methods, because Roy states that using these help to reduce the ghost signals also known as echo. (Roy, column 17, lines 44-60)

Claim 2: The method of claim 1, wherein said changing said parameters includes copying one or more parameters of said background adaptive filter into respective one or more parameters of said foreground adaptive filter. (Ericksson, column 3, lines 20-25; The coefficients from the adaptive background filter 12 are transferred to the programmable foreground filter 18 whenever the adaptive background filter 12 is considered better than the programmable foreground filter 18.)

Claim 3: The method of claim 1, wherein said changing said parameters includes: determining a third bulk delay of the echo signal using said foreground adaptive filter; (It is the Examiners position that multiple bulk delays could be calculated based on the number of reflective paths in the communications environment; see bulk delay rejection above)

configuring said foreground adaptive filter to said open-loop mode to determine new parameters for said foreground adaptive filter; and (Ericksson, Figure 4, one filter is open-loop the other is closed-loop. It would have been obvious to one skilled in the art at the time of the invention to try reconfiguring the foreground filter back and forth between open and closed-loop mode since there are only four permutations both filters in closed-loop, both filters in open-loop, one in open-loop the other in closed-loop or vice versa. In addition, the copying of coefficients from one filter to the other provides this simulation of changing to from open-loop to closed-loop configuration.)

configuring said foreground adaptive filter to said closed-loop mode to update said new parameters, (Ericksson, Figure 4, one filter is open-loop the other is closed-loop. It would have been obvious to one skilled in the art at the time of the invention to try reconfiguring the foreground filter back and forth between open and closed-loop mode since there are only four permutations both filters in closed-loop, both filters in open-loop, one in open-loop the other in closed-loop or vice versa. In addition, the copying of coefficients from one filter to the other provides this simulation of changing to from open-loop to closed-loop configuration.)

Claim 4: The method of claim 1, wherein said background adaptive filter is updated more aggressively in presence of a double talk detection than said foreground adaptive filter.(Ericksson, column 3, lines 27-34; During double-talk the coefficients are kept for echo cancellation within the background filter [background adaptive filter is updated more aggressively in presence of a double talk])

Claim 7: The method of claim 1, wherein said background adaptive filter operates in said open-loop mode only. (Ericksson, Figure 4, one filter is open-loop the other is closed-loop)

Claim 8: The method of claim 1, wherein said measuring measures an echo return loss enhancement (ERLE) of said foreground adaptive filter and an ERLE of said background adaptive filter. (Ericksson, columns 3 and 4, lines 50-67 and 1-17; calculation of an ERLE)

Claim 9: The method of claim 1 further comprising: determining a third bulk delay of said echo signal using said background adaptive filter if said measuring determines that said echo cancellation performance of said foreground adaptive filter is better than said echo cancellation performance of said background adaptive filter. (Ericksson, column 3, lines 34-64; compare the residual energy from the two filters which is the use of an ERLE to determine the performance of one filter to be better than the performance of the other)

Claim 10: The method of claim 1 further comprising: determining a third bulk delay of said echo signal using said background adaptive filter if said measuring determines that said foreground adaptive filter and/or said background adaptive filter are performing badly. (It is the Examiners position that multiple bulk delays could be calculated based on the number of reflective paths in the communications environment; see bulk delay rejection above)

Claim 11: The method of claim 10, wherein said third bulk delay is indicative of said echo path change. (It is the Examiners position that multiple bulk delays could be calculated based on the number of reflective paths in the communications environment; see bulk delay rejection above)

Claim 12: The method of claim 1, wherein said determining said second bulk delay occurs prior to configuring said foreground adaptive filter to said closed-loop mode. (Ericksson, Figure 4, one filter is open-loop the other is closed-loop. It would have been obvious to one skilled in the art at the time of the invention to try reconfiguring the foreground filter back and forth between open and closed-loop mode since there are only four permutations both filters in closed-loop, both filters in open-loop, one in open-loop the other in closed-loop or vice versa. In addition, the copying of coefficients from one filter to the other provides this simulation of changing to from open-loop to closed-loop configuration.)

<u>Claim 13:</u> An echo canceller capable of detecting an echo path change and adjusting to said echo path change, said echo canceller comprising: (Ericksson, column 3, lines 26-34; During double-talk the coefficients that were transferred to the programmable foreground filter 18 just before double-–talk situation occurred are kept for echo cancellation during the double talk-period.

Once the double-talk situation no longer exists and the adaptive background filter 12 is determined to give better performance, filter coefficients are once again transferred from filter 12 to filter 18.[detect an echo path change and adjust to said echo path change])

a foreground adaptive filter configured to determine a first bulk delay of an echo signal, (Roy, column 14, lines 19-37; For optimum performance, the IIR section should be continuous (i.e., have contiguous non-zero taps) so that it can cancel all post ghosts within the span of the filter. This necessitates an extremely long and expensive IIR section for practical ranges further, cancellation of a few prominent post ghosts leads to the greatest improvement in visual quality. This latter reasoning leads to the implementation of the IIR section as a sparse filter, consisting of six sections each having eight taps. Each section is positioned at a prominent post-ghost location using a programmable bulk delay determined by examining the peaks of channel impulse response, thereby allowing attenuation of the six strongest post-ghosts by this method.)

wherein said foreground adaptive filter is a SPARSE filter, and wherein said foreground adaptive filter is further configured to an open-loop mode and cancels said echo signal based on said first bulk delay, and (Roy, column 14, lines 19-37; For optimum performance, the IIR section should be continuous (i.e., have contiguous non-zero taps) so that it can cancel all post ghosts within the span of the filter. This necessitates an extremely long and expensive IIR section for practical ranges further, cancellation of a few prominent post ghosts leads to the greatest improvement in visual quality. This latter reasoning leads to the implementation of the IIR section as a sparse filter, consisting of six sections each having eight taps. Each section is positioned at a prominent post-ghost location using a programmable bulk delay determined by examining the peaks of channel impulse response, thereby allowing attenuation of the six strongest post-ghosts by this method.) (Ericksson, Figure 4, one filter is open-loop the other is closed-loop. It would have been obvious to one skilled in the art at the time of the invention to try reconfiguring the foreground filter back and forth between open and closed-loop mode since there are only four permutations both filters in closed-loop, both filters in open-loop, one in open-loop the other in closed-loop or vice versa. In addition, the copying of coefficients from one filter to the other provides this simulation of changing to from open-loop to closed-loop configuration.)

wherein said foreground adaptive filter is configured to a closed-loop mode after being configured to said open-loop mode, and wherein said foreground adaptive filter continues to cancel said echo signal based on said first bulk delay in said closed-loop mode; and (Ericksson, Figure 4, one filter is open-loop the other is closed-loop. It would have been obvious to one skilled in the art at the time of the invention to try reconfiguring the foreground filter back and forth between open and closed-loop mode since there are only four permutations both filters in closed-loop, both filters in open-loop, one in open-loop the other in closed-loop or vice versa. In addition, the copying of coefficients from one filter to the other provides this simulation of changing to from open-loop to closed-loop configuration.)

a background adaptive filter configured to determine a second bulk delay of said echo signal, wherein said background adaptive filter is a SPARSE filter, and wherein said background adaptive filter is further configured to said open-loop mode after determining said second bulk delay; (Ericksson, Figure 4, one filter is open-loop the other is closed-loop. It would have been obvious to one skilled in the art at the time of the invention to try reconfiguring the foreground filter back and forth between open and closed-loop mode since there are only four permutations both filters in closed-loop, both filters in open-loop, one in open-loop the other in closed-loop or vice versa. In addition, the copying of coefficients from one filter to the other provides this simulation of changing to from open-loop to closed-loop configuration.)

wherein said echo canceller measures an echo cancellation performance of said foreground adaptive filter and an echo cancellation performance of said background adaptive filter, and changes parameters of said foreground adaptive filter if said echo canceller determines that said echo cancellation performance of said background adaptive filter is better than said echo cancellation performance of said foreground adaptive filter. (Ericksson, column 3, lines 20-25; the coefficients from the adaptive background filter 12 are transferred to the programmable foreground filter 18 whenever the adaptive background filter 12 is considered better than the programmable foreground filter 18.)

Ericksson teaches all the limitations of claim 1 above except bulk delay and SPARSE/down sampling. Roy, a teaching within analogous art, teaches the use of bulk delay and sparse filter adaptation. It would have been obvious to one skilled in the art at the time of the invention to modify Ericksson by Roy's bulk delay and sparse filtering methods, because Roy states that using these help to reduce the ghost signals also known as echo. (Roy, column 17, lines 44-60)

Claim 14: The echo canceller of claim 13, wherein said echo canceller changes said parameters by copying one or more parameters of said background adaptive filter into respective one or more parameters of said foreground adaptive filter. (Ericksson, column 3, lines 20-25; The coefficients from the adaptive background filter 12 are transferred to the programmable foreground filter 18 whenever the adaptive background filter 12 is considered better than the programmable foreground filter 18.)

Claim 15: The echo canceller of claim 13, wherein said echo canceller changes said parameters by: determining a third bulk delay of the echo signal using said foreground adaptive filter; (It is the Examiners position that multiple bulk delays could be calculated based on the number of reflective paths in the communications environment; see bulk delay rejection above)

configuring said foreground adaptive filter to said open-loop mode to determine new parameters for said foreground adaptive filter; and (Ericksson, Figure 4, one filter is open-loop the other is closed-loop. It would have been obvious to one skilled in the art at the time of the invention to try reconfiguring the foreground filter back and forth between open and closed-loop mode since there are only four permutations both filters in closed-loop, both filters in open-loop, one in open-loop the other in closed-loop or vice versa. In addition, the copying of coefficients from one filter to the other provides this simulation of changing to from open-loop to closed-loop configuration.)

configuring said foreground adaptive filter to said closed-loop mode to update said new parameters. (Ericksson, Figure 4, one filter is open-loop the other is closed-loop. It would have been obvious to one skilled in the art at the time of the invention to try reconfiguring the foreground filter back and forth between open and closed-loop mode since there are only four permutations both filters in closed-loop, both filters in open-loop, one in open-loop the other in closed-loop or vice versa. In addition, the copying of coefficients from one filter to the other provides this simulation of changing to from open-loop to closed-loop configuration.)

Claim 16: The echo canceller of claim 13, wherein said background adaptive filter is updated more aggressively in presence of a double talk detection than said foreground adaptive filter. (Ericksson, column 3, lines 27-34; during double-talk the coefficients are kept for echo cancellation within the background filter [background adaptive filter is updated more aggressively in presence of a double talk])

Claim 19: The echo canceller of claim 13, wherein said background adaptive filter operates in said open-loop mode only. (Ericksson, Figure 4, one filter is open-loop the other is closed-loop)

Claim 20: The echo canceller of claim 13, wherein said echo canceller measures an echo return loss enhancement (ERLE) of said foreground adaptive filter and an ERLE of said background adaptive filter. (Ericksson, columns 3 and 4, lines 50-67 and 1-17; calculation of an ERLE)

Claim 21: The echo canceller of claim 13, wherein said background adaptive filter determines a third bulk delay of said echo signal if said echo canceller determines that said echo cancellation performance of said foreground adaptive filter is better than said echo cancellation performance of said background adaptive filter. (Ericksson, column 3, lines 20-25; The coefficients from the adaptive background filter 12 are transferred to the programmable foreground filter 18 whenever the adaptive background filter 12 is considered better than the programmable foreground filter 18. And it is the Examiners position that multiple bulk delays could be calculated based on the number of reflective paths in the communications environment; see bulk delay rejection above)

Claim 22: The echo canceller of claim 13, wherein said background adaptive filter determines a third bulk delay of said echo signal if said echo canceller determines that said foreground adaptive filter and/or said background adaptive filter are performing badly. (It is the Examiners position that multiple bulk delays could be calculated based on the number of reflective paths in the communications environment; see bulk delay rejection above)

Claim 23: The echo canceller of claim 22, wherein said third bulk delay is indicative of said echo path change. (It is the Examiners position that multiple bulk delays could be calculated based on the number of reflective paths in the communications environment; see bulk delay rejection above)

Claim 24: The echo canceller of claim 13, wherein said echo background adaptive filter determines said second bulk delay prior to said foreground adaptive filter is configured to said closed-loop mode. (Ericksson, Figure 4, one filter is open-loop the other is closed-loop. It would have been obvious to one skilled in the art at the time of the invention to try reconfiguring the foreground filter back and forth between open and closed-loop mode since there are only four permutations both filters in closed-loop, both filters in open-loop, one in open-loop the other in closed-loop or vice versa.)

8. Claims 5-6 and17-18 are rejected under 35 U.S.C. 103(a) as being unpatentable over Ericksson US Patent No. 6,219,418 in view of Roy US Patent No. 5,347,177 as applied to claims 1 and 13 above and further in view of Yatrou US Patent No. 5.343,522.

Claim 5: The method of claim 1 further comprising: moving said foreground adaptive filter to a downsample domain prior to said determining said first bulk delay; and moving said foreground adaptive filter to a regular domain for canceling said echo signal based on said first bulk delay. (Yatrou, columns 3-5; lines 63-68, 1-68 and 1-40, respectively; Yatrou deactivates the lowest sum active region and activates the dormant region with the largest sum thereby moving to a downsample domain and back to a regular dormant.)

Ericksson teaches all the limitations of claim 1 above except bulk delay and SPARSE/down sampling. Roy, a teaching within analogous art, teaches the use of bulk delay and sparse filter adaptation. Roy is silent regarding the details of sparse filtering. Yatrou, another teaching within analogous art, teaches the use of SPARSE filtering also known as down sampling in further detail. It would have been obvious to one skilled in the art at the time of the invention to modify Ericksson by Roy's bulk delay and sparse filtering along with providing further detail to Roy's sparse filtering by use of Yatrou's SPARSE/down sampling methods, because Roy states that using bulk delay helps to reduce the ghost signals (Roy, column 17, lines 44-60) and Yatrou states that sparse/down sampling reduces computation time and increases speed of convergence. (Yatrou, page 1, abstract)

Claim 6: The method of claim 1 further comprising: moving said background adaptive filter to a downsample domain prior to said determining said second bulk delay. (Yatrou, columns 3-5; lines 63-68, 1-68 and 1-40, respectively; Yatrou deactivates the lowest sum active region and activates the dormant region with the largest sum thereby moving to a downsample domain and back to a regular dormant.)

Ericksson teaches all the limitations of claim 1 above except bulk delay and SPARSE/down sampling. Roy, a teaching within analogous art, teaches the use of bulk delay and sparse filter adaptation. Roy is silent regarding the details of sparse filtering. Yatrou, another teaching within analogous art, teaches the use of SPARSE filtering also known as down sampling in further detail. It would have been obvious to one skilled in the art at the time of the invention to modify Ericksson by Roy's bulk delay and sparse filtering along with providing further detail to Roy's sparse filtering by use of Yatrou's SPARSE/down sampling methods, because Roy states that using bulk delay helps to reduce the ghost signals (Roy, column 17, lines 44-60) and Yatrou states that sparse/down sampling reduces computation time and increases speed of convergence. (Yatrou, page 1, abstract)

Claim 17: The echo canceller of claim 13, wherein said foreground adaptive filter determines said first bulk delay in a downsample domain, and wherein said foreground adaptive filter moves to a regular domain for canceling said echo signal based on said first bulk delay. (Yatrou, columns 3-5; lines 63-68, 1-68 and 1-40, respectively; Yatrou deactivates the lowest sum active region and activates the dormant region with the largest sum thereby moving to a downsample domain and back to a regular dormant.)

Ericksson teaches all the limitations of claim 1 above except bulk delay and SPARSE/down sampling. Roy, a teaching within analogous art, teaches the use of bulk delay and sparse filter adaptation. Roy is silent regarding the details of sparse filtering. Yatrou, another teaching within analogous art, teaches the use of SPARSE filtering also known as down sampling in further detail. It would have been obvious to one skilled in the art at the time of the invention to modify Ericksson by Roy's bulk delay and sparse filtering along with providing further detail to Roy's sparse filtering by use of Yatrou's SPARSE/down sampling methods, because Roy states that using bulk delay helps to reduce the ghost signals (Roy, column 17, lines 44-60) and Yatrou states that sparse/down sampling reduces computation time and increases speed of convergence. (Yatrou, page 1, abstract)

Claim 18: The echo canceller of claim 13, wherein said background adaptive filter determines said second bulk delay in a downsample domain. (Yatrou, columns 3-5; lines 63-68, 1-68 and 1-40, respectively; Yatrou deactivates the lowest sum active region and activates the dormant region with the largest sum thereby moving to a downsample domain and back to a regular dormant.)

Ericksson teaches all the limitations of claim 1 above except bulk delay and SPARSE/down sampling. Roy, a teaching within analogous art, teaches the use of bulk delay and sparse filter adaptation. Roy is silent regarding the details of sparse filtering. Yatrou, another teaching within analogous art, teaches the use of SPARSE filtering also known as down sampling in further detail. It would have been obvious to one skilled in the art at the time of the invention to modify Ericksson by Roy's bulk delay and sparse filtering along with providing further detail to Roy's sparse filtering by use of Yatrou's SPARSE/down sampling methods, because Roy states that using bulk delay helps to reduce the ghost signals (Roy, column 17, lines 44-60) and Yatrou states that sparse/down sampling reduces computation time and increases speed of convergence. (Yatrou, page 1, abstract)

Conclusion

9. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. Danstrom US Patent No. 4,582,963 uses multiple ways of calculating bulk delay. Tahernezhaadi US Patent No. 6,944,289 uses various

downsampling locations. Lu US Patent No. 5,777,910 uses SPARSE foreground and background filters for similar echo cancellation.

10. Any inquiry concerning this communication or earlier communications from the examiner should be directed to LAURI HARRIS whose telephone number is (571)270-7482. The examiner can normally be reached on Monday-Thursday 7:30-5:00.

11. If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Sam Yao can be reached on 571-272-1224. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

12. Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/LH/

/Michael C. Astorino/
Primary Examiner, Art Unit 3769

January 5, 2009