# PPAC Patent End-to-End Update

**April 29, 2010**

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# Develop and Deploy 21st Century Information Technology System

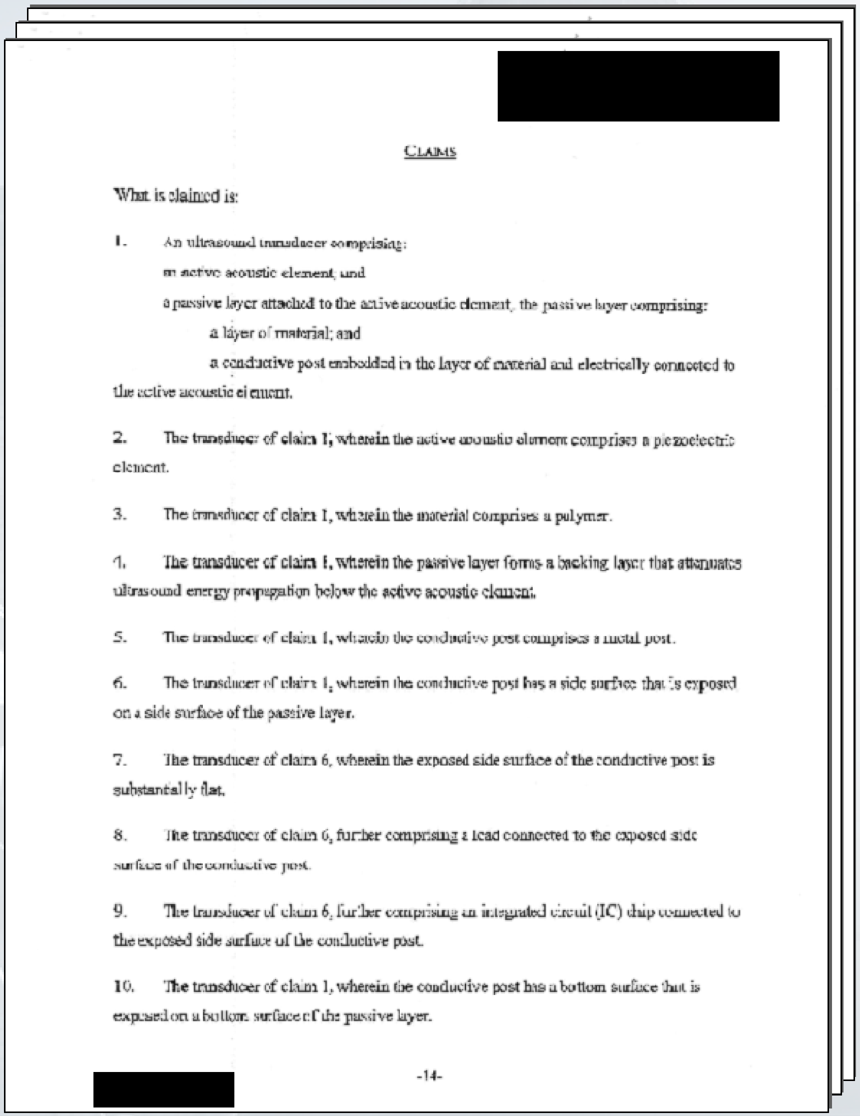
- We're building a new patent system from end-to-end emphasizing the following principles:
- **Stop, Look and Listen**: Stop investing in endless modifications to our outdated systems; look at what other agencies and industry are doing; and listen to our employees and stakeholders to determine their wants and needs.
- **Build Smart, Build Fast but Own the Design**: We will embrace an agile and iterative development methodology to incrementally build and improve core functionality, and then scale to meet the broad needs of our user community.
- **Stakeholder Needs Lead**: For these changes to make an impact on timeliness and quality, our new system must fully meet the needs and desires of our employees, and be flexible enough to absorb continuous change going forward.

# Vision for 21st Century End-to-End Patent IT System

- Open Standards
- Maintainability, Scalability
- Optimization of cost and time
- Visibility of information
- Usability (of data, interfaces)
- State of the art search and comparison tools
- Collaboration support

# Creating Claim Tree

## Original Claims



[redacted]

CLAIMS

What is claimed is:

1. An ultrasound transducer comprising:
an active acoustic element; and
a passive layer attached to the active acoustic element, the passive layer comprising:
a layer of material; and
a conductive post embedded in the layer of material and electrically connected to the active acoustic element.

2. The transducer of claim 1, wherein the active acoustic element comprises a piezoelectric element.

3. The transducer of claim 1, wherein the material comprises a polymer.

4. The transducer of claim 1, wherein the passive layer forms a backing layer that attenuates ultrasound energy propagation below the active acoustic element.

5. The transducer of claim 1, wherein the conductive post comprises a metal post.

6. The transducer of claim 1, wherein the conductive post has a side surface that is exposed on a side surface of the passive layer.

7. The transducer of claim 6, wherein the exposed side surface of the conductive post is substantially flat.

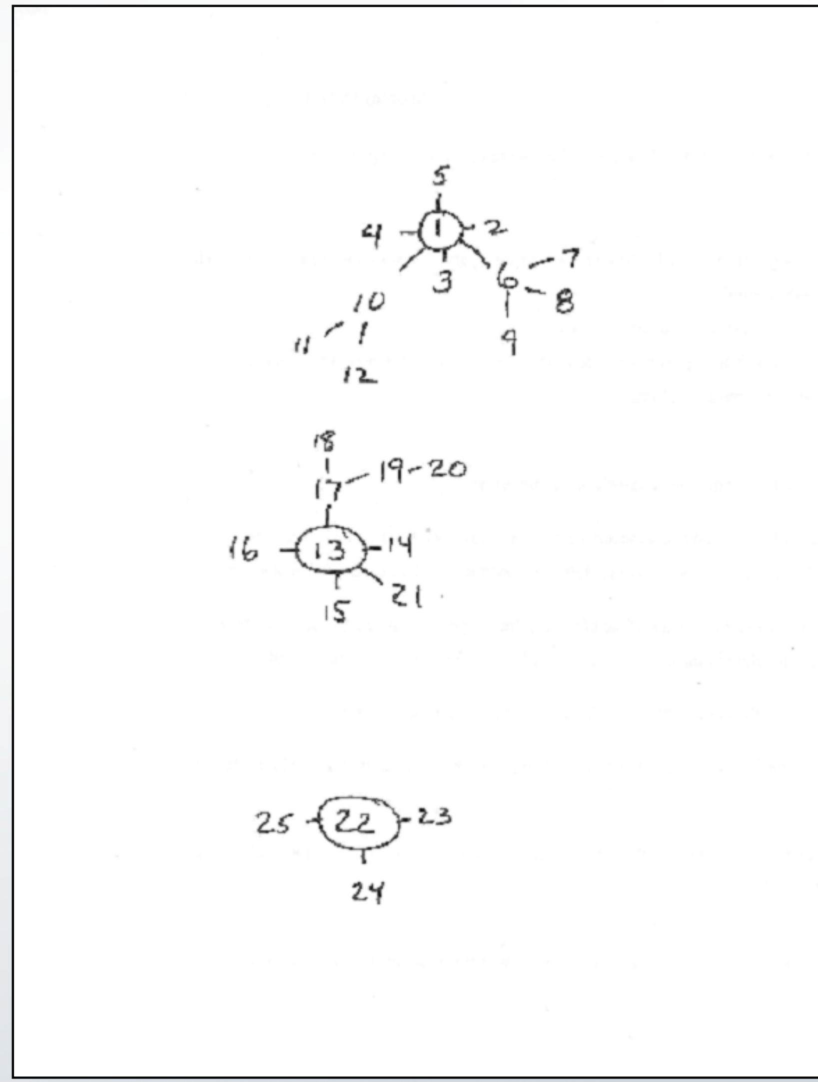
8. The transducer of claim 6, further comprising a lead connected to the exposed side surface of the conductive post.

9. The transducer of claim 6, further comprising an integrated circuit (IC) chip connected to the exposed side surface of the conductive post.

10. The transducer of claim 1, wherein the conductive post has a bottom surface that is exposed on a bottom surface of the passive layer.

[redacted] -14-

## Claim Dependencies



# Matching Figures to Spec



lead may be connected directly to the exposed area of the top electrode 113. In another alternative embodiment, the matching layer may be made of a conductive material, e.g., silver epoxy, with the lead connected to the matching layer.

**[0031]** Although the exemplary embodiments in the Figures show the conductive post 135 having two exposed surfaces, the post 135 may only have an exposed bottom surface. For example, the post may be located within the backing layer with no exposed side surface. Alternatively, the post may only have an exposed side surface and not extend all the way down to the bottom of the backing layer.

**[0032]** A batch process for fabricating transducers according to an exemplary embodiment will now be given with reference to Figures 5(a)-5(h). The batch process is compatible with MEMS microfabrication techniques. In this example, the post is made of deposited metal, although other conductive materials, e.g., heavily doped silicon, may also be used.

**[0033]** Figure 5(a) shows an active element layer 210, e.g., a piezoelectric element, with electrode layers 213, 217, e.g., gold on chrome electrode. The active element layer 210 rests on a carrier 260, e.g., silicon wafer, for supporting the transducer layers during fabrication. A layer of light-sensitive photoresist 265, e.g., SU-8 or KMPR, is applied on top of the active element 210 using spin coating. The photoesist layer 265 can be either positive or negative based on its response to light. Positive photoresist becomes weaker and more soluble when exposed to light while negative photoresist becomes stronger and less soluble when exposed to light. Photoresists are commonly used in IC and MEMS fabrication with consistent repeatable results.

**[0034]** In Figure 5(b), a mask 270, e.g., chrome on glass, is used in conjunction with light exposure equipment to form a pattern in the photoresist 265. In this example, the photoresist 265 is positive and the mask 270 is transparent in areas where the photoresist 265 is to be removed to form the posts. UV light 275 is filtered through the mask 270 and reaches the underlying photoresist 265. The areas of the photoresist 265 corresponding to the transparent areas 280 of the mask 270 are exposed to the UV light 275. For the example of negative photoresist, the mask would be opaque in areas where the photoresist is to be removed.

[redacted]



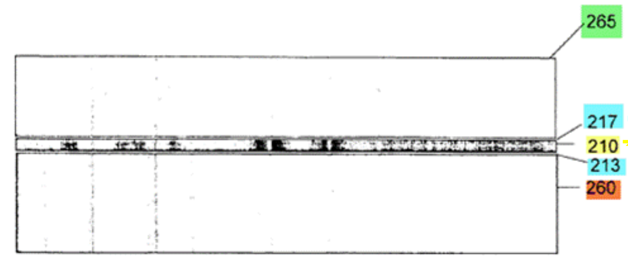



FIG. 5(a)

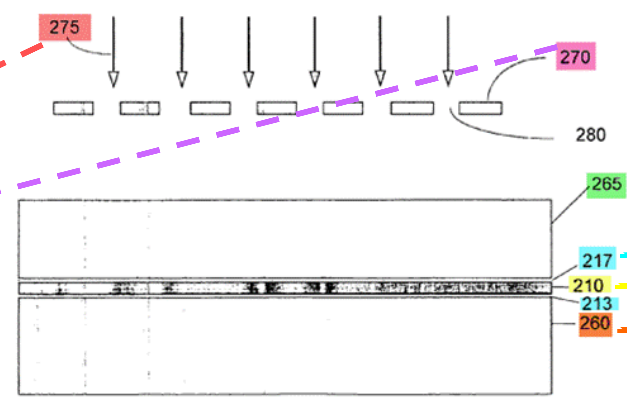



FIG. 5(b)

# Matching Claims to Spec



bottom surfaces of the active element 110, respectively. The electrodes 113 and 117 may comprise thin layers of gold, chrome, or other conductive material. The transducer's emitting face may have a square shape, circular shape, or other shape.

**[0026]** The transducer 105 further comprises a matching layer 120 on top of the active element 110 and a backing layer 130 on the bottom of the active element 110. The transducer 105 further comprises a conductive, e.g., metal, post 135 embedded in the backing layer 130 to provide a direct electrical connection to the active element 110. As discussed further below, the conductive post 135 can be fabricated using current microfabrication techniques, e.g., integrated circuit (IC) and MEMS fabrication techniques. In the embodiment shown in Figures 2 and 3, the conductive post 130 includes an exposed side surface 140, e.g., a chamfer, and an exposed bottom surface 145. This allows a lead to be connected to the conductive post 135 on either the exposed side surface 145 or the exposed bottom surface. Figure 4(a) shows an example of the transducer 105 with a lead 150 connected to the side surface 140 of the post 135, e.g., using solder, epoxy, or laser welding. Figure 4(b) shows an example of the transducer 105 with a lead 155 connected to the bottom surface 145 of the post 135. The lead 150 or 155 may be part of a twisted wire pair coupled to an ultrasound system. Alternatively, the lead 150 or 155 may be connected at the other end to a coaxial cable coupled to the ultrasound system. In the Figures, the backing layer is shown semi-transparent so that the embedded conductive post is visible in the Figures.

**[0027]** The conductive post 135 provides a better electrical connection to the active element 110 with lower resistance compared with prior art methods, in which the lead is electrically connected to the active element through a secondary conduction path such as through the housing and/or the backing layer. The series resistance can be reduced considerably depending on the material used for the post 135, e.g., nickel, gold, copper, etc., with gold being the optimal choice from a performance standpoint. Further, the conductive post 135 improves flexibility in the design of the transducer by increasing the number of passive materials that are available to form the transducer. This is because the choice of passive materials is no longer limited to conductive materials. Since the conducive post provides conduction that is





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2. The transducer of claim 1, wherein the active acoustic element comprises a piezoelectric element.

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4. The transducer of claim 1, wherein the passive layer forms a backing layer that attenuates ultrasound energy propagation below the active acoustic element.

5. The transducer of claim 1, wherein the conductive post comprises a metal post.

6. The transducer of claim 1, wherein the conductive post has a side surface that is exposed on a side surface of the passive layer.

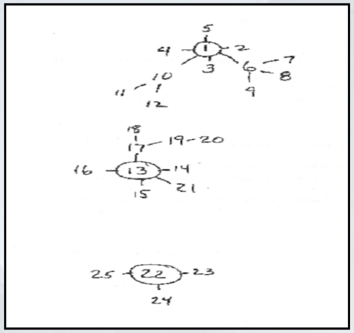
7. The transducer of claim 6, wherein the exposed side surface of the conductive post is substantially flat.

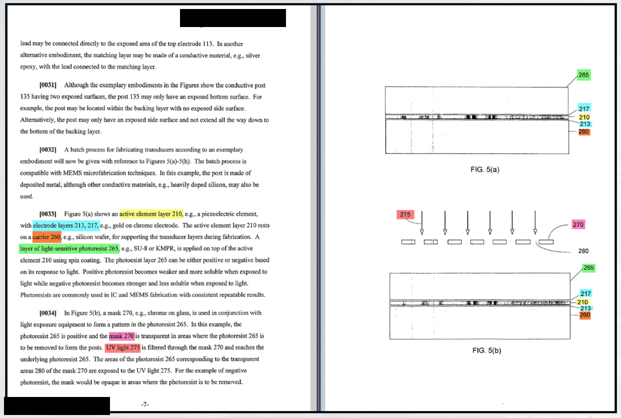
8. The transducer of claim 6, further comprising a lead connected to the exposed side surface of the conductive post.

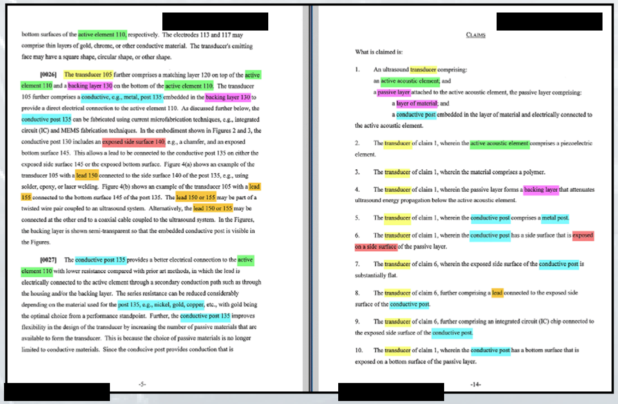
9. The transducer of claim 6, further comprising an integrated circuit (IC) chip connected to the exposed side surface of the conductive post.

10. The transducer of claim 1, wherein the conductive post has a bottom surface that is exposed on a bottom surface of the passive layer.

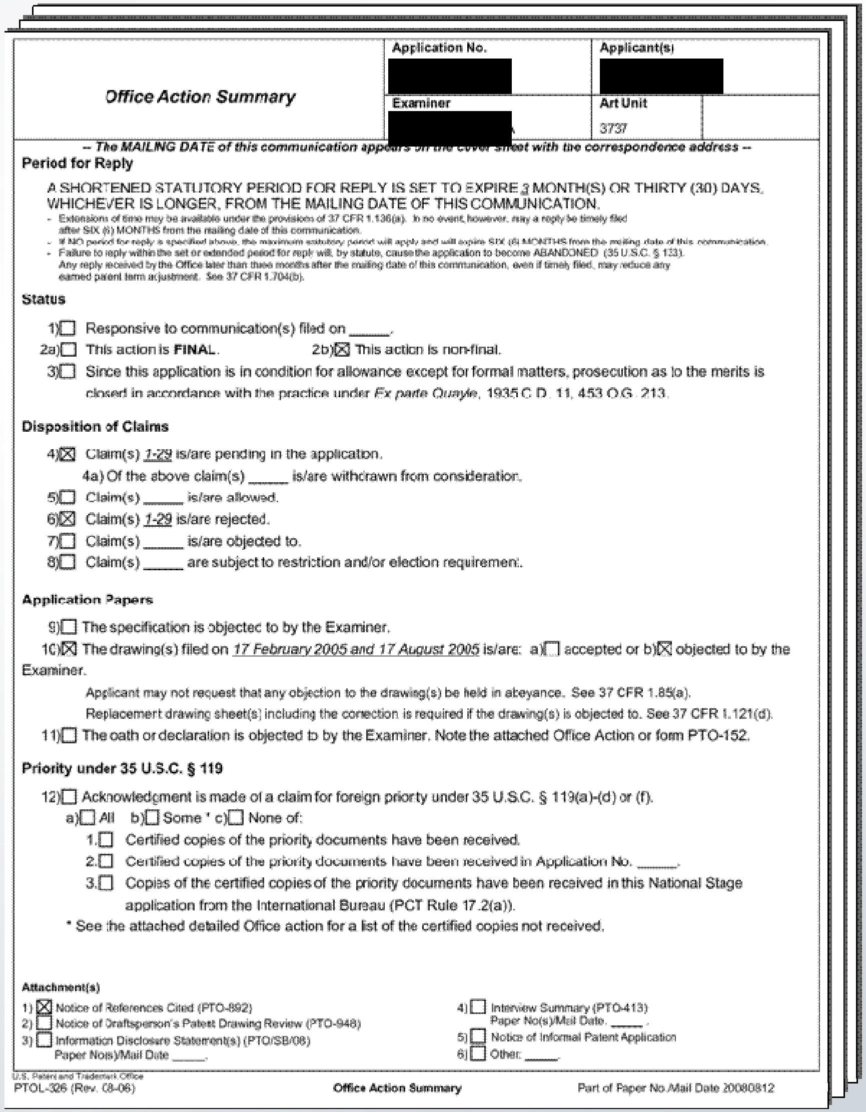
# Combining into an Office Action





## Office Action



| *Office Action Summary* | Application No. [redacted] | Applicant(s) [redacted] |
|---|---|---|
| | Examiner [redacted] | Art Unit 3737 |

-- 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 ____.

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) *1-29* 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) *1-29* 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 *17 February 2005 and 17 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 ____.

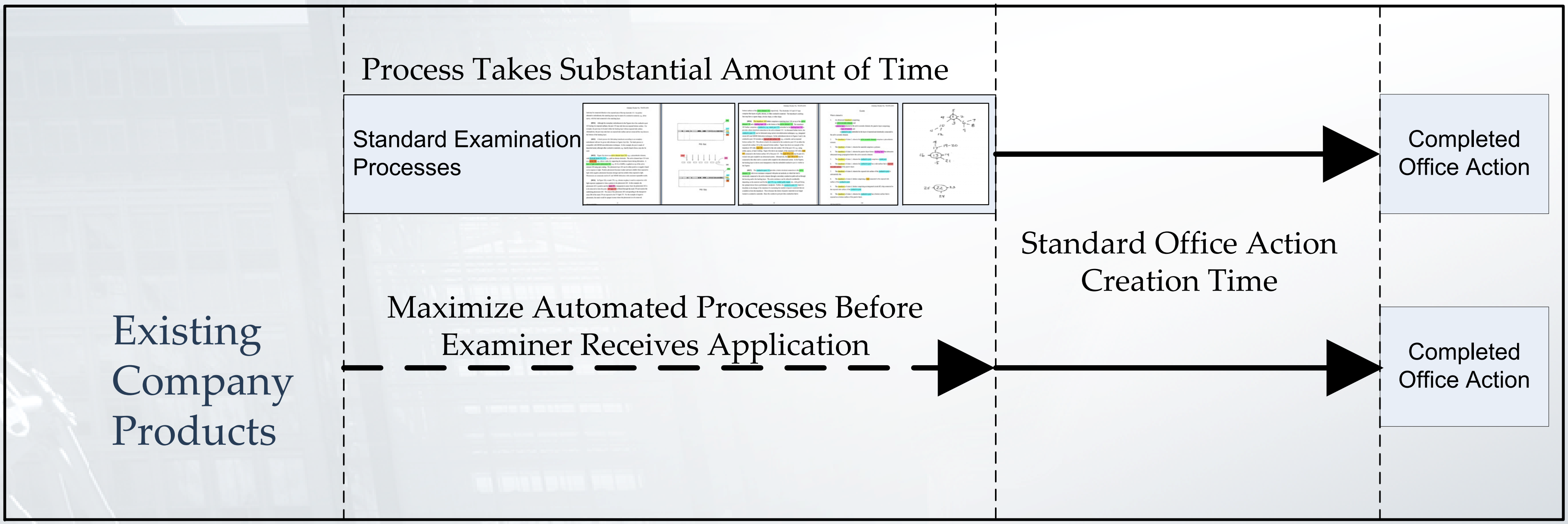
4)☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. ____.

5)☐ Notice of Informal Patent Application

6)☐ Other: ____.

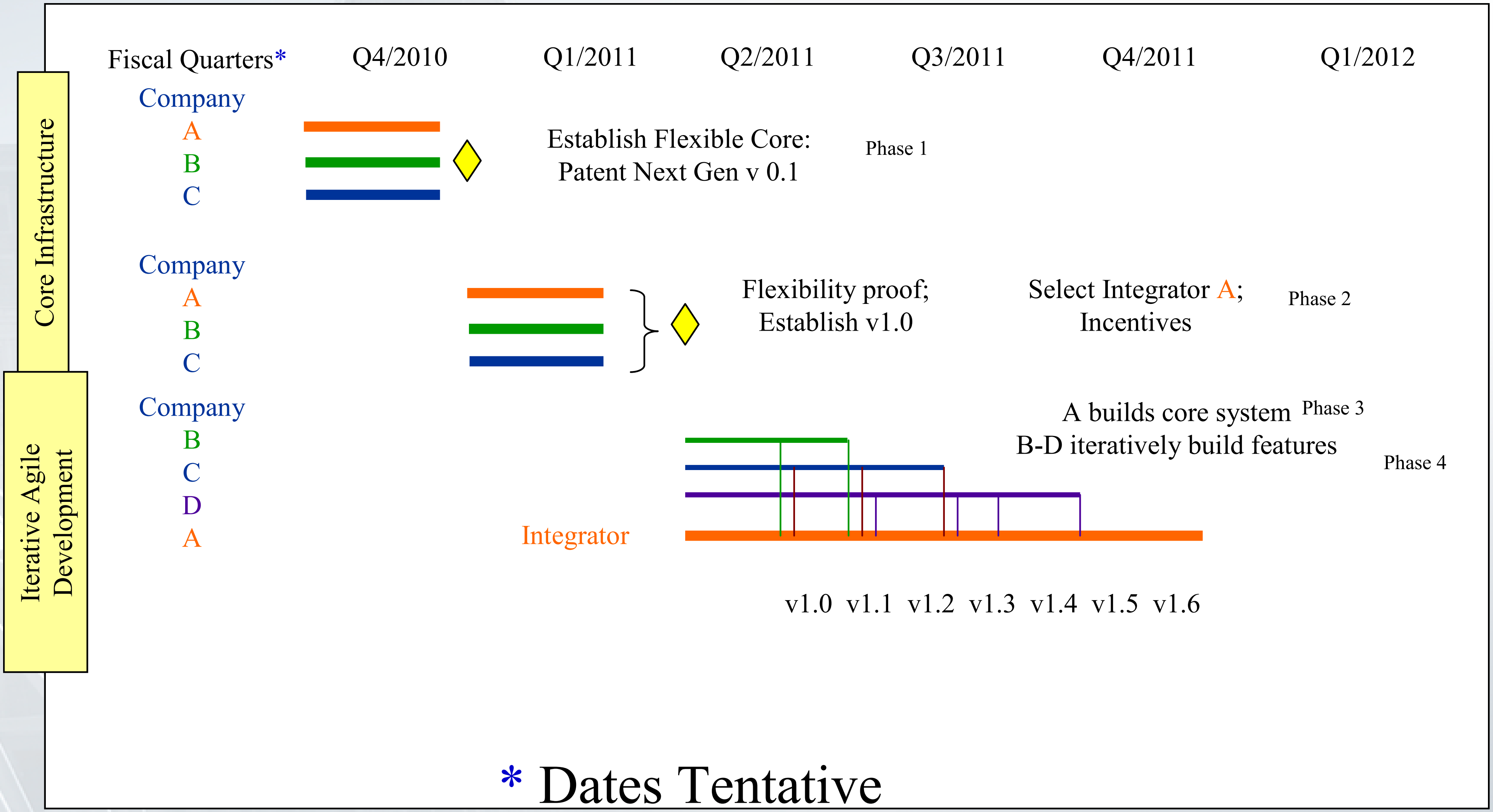
U.S. Patent and Trademark Office
PTOL-326 (Rev. 08-06) **Office Action Summary** Part of Paper No./Mail Date 20080812

# Automated Process Compared to Standard Examination Process




*** Error reduction equals better quality ***

# Proposed IT Development Plan (Agile Methodology)



# Ongoing OCIO Initiatives

- PALM New Count System
    - 11/21/09:  Release of RCEs on Examiner's "Special New" Docket
    - 12/27/09:  Beta Deployment of PALM New Count System
        - Provides Examiners with more time to work on a case
        - Encourages compact prosecution and reduction of pendency
    - 02/14/10:  Production Deployment of PALM New Count System
    - 04/06/10:  Award Calculator Deployment
    - Summer 2010 (Planned):
        - Web Services for SPE Management Database
        - Management Reports migration to Patent's Datamart
        - Trouble Shooting Services

# Ongoing OCIO Initiatives

- Patent Term Adjustment (PTA)
  - 02/09/10: PALM ExPo Deployment of calculation file (one # grant) for published applications
  - 02/14/10: PAIR (Public/Private) Deployments of calculation reporting and display of total PTA time for each grant patent
  - 02/27/10: PALM ExPo / PRS Deployments of calculation reporting and display of total PTA time for each grant patent
  - 04/16/10: Deployed automated functionality to address petitions.
    - Included automated printing/mailing of PTA Petition Decisions
    - Mailed out 18,000 backlogged petitions
  - July 2010 (Planned): PALM ExPo / PRS / PAIR (Public/Private) deployments for complete display and logic of the calculation, as well as calculation problems dating back to 2001

# Ongoing OCIO Initiatives

- EFS Web Backup
- MPEP
- Google, Petitions, and No-cost Dissemination Contract
- Single Laptop Program
- PTONet Upgrade