



# Portfolio Analysis

RPO Inc. Digital Waveguide Touch™

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## **EXECUTIVE SUMMARY**

RPO Inc. is liquidating its manufacturing equipment and intellectual property assets through a sealed bid auction scheduled on November 3rd, 2011 in Fremont California.

RPO is a touch-screen technology developer headquartered in Fremont, California with an extensive R&D facility in Canberra, Australia. RPO's unique offering is the Digital Waveguide Touch™ technology that uses optical beams based touch performance, overcoming the shortcomings of the existing resistive and capacitive based touch technologies. RPO's technology makes the touch-screens power efficient while preventing deterioration of display brightness and contrast. The company has volume manufacturing capability, with an assembly line in Sydney offering high scalability.

Founded in 2000 to develop plastic waveguides for optical connections between computers, RPO realigned its strategy in the direction of display technologies in 2005. It raised a total of \$55 million in equity, from investors such as GE Commercial Finance, BASF Venture Capital GmbH, JAFCO Asia, Neo Technology Ventures, Jolimont Capital Pty. Ltd., Allen & Buckeridge and Canberra Business Development Fund for development in display technology.

In April 2011, RPO filed for bankruptcy and has engaged Hilco Streambank to liquidate its intellectual property covering the DWT technology and other generic touch screen patents.

This report presents iRunway's classification of the RPO patent portfolio and highlights a strength analysis of the patents according to iRunway's proprietary ranking algorithms.

## RPO DWT™ TECHNOLOGY

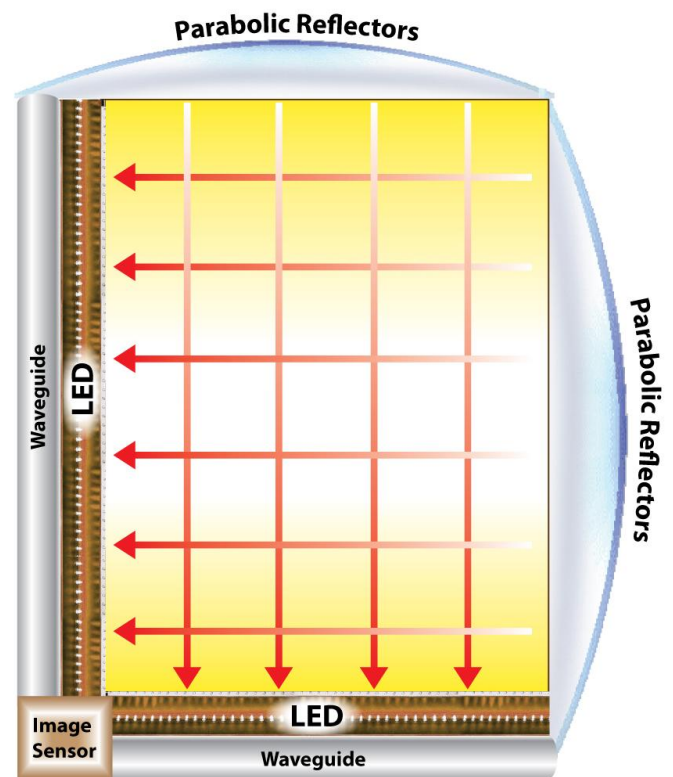
Digital Waveguide Touch technology, based on RPO's heavily-patented polymer waveguide process, can be applied to any product that benefits from having a touch-screen interface. Products include game players, cell phones, PDAs, GPS systems, automotive control displays, multimedia players, tablet PCs and a number of professional applications, such as ATM's and Gambling Machines.

DWT is based on the interruption of invisible light beams and needs no touch panel overlay. This gives key benefits over other touch screen technologies, including improved screen clarity, higher display brightness and extended battery life. Apart from these DWT provides multiple touch capability, excellent accuracy in detection and position, all at a very cost-effective price point.

DWT features a low-power semiconductor light source, which distributes infra-red light via a number of light channels (waveguides) to the bezel of a flat panel display. The light is then projected through free space and illuminates reciprocal waveguides behind the opposing bezel. Any interruption of the light beam is instantaneously detected by a light sensor camera.

The DWT touch-screen module is assembled around a central rectangular LCD panel with the waveguides mounted to the bottom and left edge of the touch-screen assembly. Infrared light is emitted by two LEDs, with each divergent IR light beam striking a parabolic reflector on the opposite side of the assembly.

DWT is a new and superior touch technology which does not need a touch sensitive overlay. It lets the user directly experience the full clarity and brightness of the display without an intermittent touchscreen layer.



Source:  
<http://www.rpo.biz/page.aspx?page=10>

The DWT technology also significantly reduces power consumption of the device compared to existing capacitive touch implementations but eliminating the need for analog to digital conversion.

## GEOGRAPHIC DISTRIBUTION

RPO owns a total of 120 patents and published applications across 29 distinct families and 10 geographies including United States (29 patents/applications), Europe (15 patents/applications) and Australia (14 patents/applications). The following map shows the geographical distribution of the portfolio.



## COMMERCIAL OPPORTUNITIES

Apple is expected to emerge as a top contender for the DWT patents and manufacturing equipment. The absence of a touch overlay would allow Apple to show off the full capability of their Retina display screens, which are currently produced by LG Display.

The IPS screens used in Apple’s iPhone were initially developed for use by professional graphic artists to overcome degradation of display at different viewing angles and the tailing effect when the screen was touched. As revolutionary as the iPhone’s retina display is, it is at best a close second when compared against to the new Super AMOLED display sported by the latest Samsung smartphones. A DWT touch screen in place of a traditional semitransparent capacitive touch overlay can give Apple back its competitive advantage at least in the display area. Apple’s motivation will be particularly acute, considering that Samsung recently showcased its own Retina resolution display.

Samsung has been investing considerable resources to develop Super AMOLED and Pixel Sense (in collaboration with Microsoft Surface), both of which integrate the screen with touch sensing capability. Hence it seems unlikely that Samsung would incorporate DWT into its upcoming devices, especially the high-end smartphones; at the same time, DWT may offer a cost-effective solution for Samsung’s mid and lower end phones that use the S-LCD or VGA displays, a market which is currently dominated by Nokia. From a legal standpoint, Samsung (and other Android OEMs) stand to gain as much by pre-empting the advantage for ‘Rockstar’ companies if they do run off with the RPO portfolio.

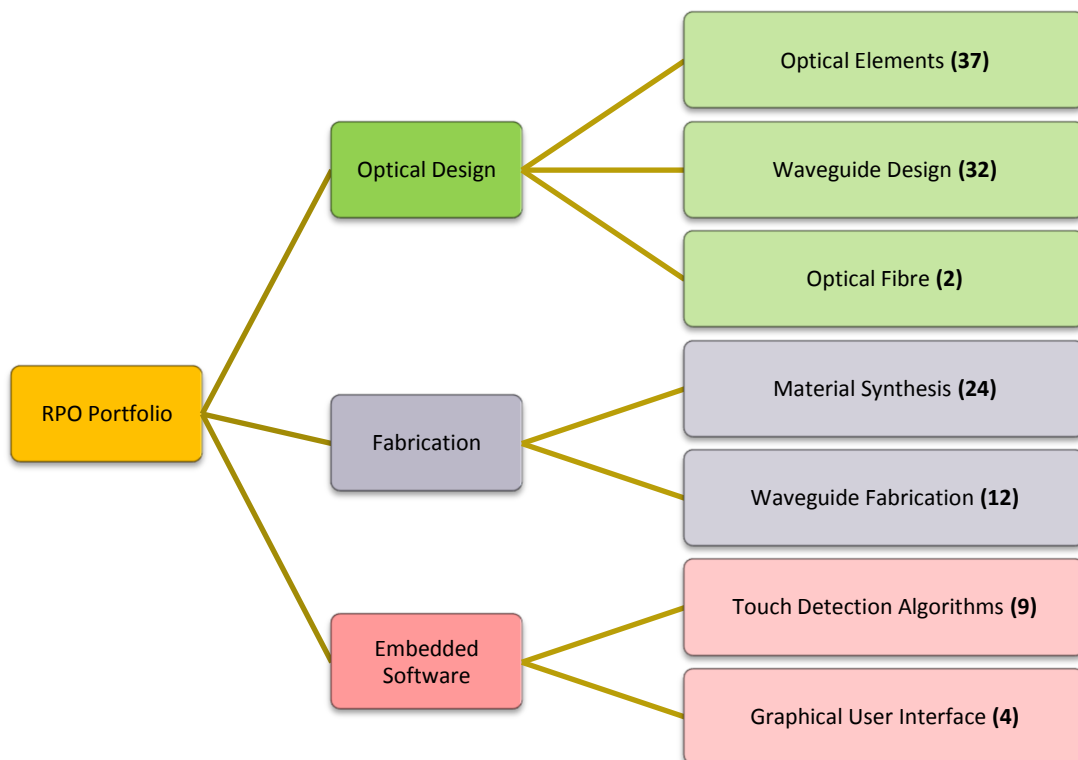
Smartphone OS	OEMs	Touch-screen manufacturers
<ul style="list-style-type: none"> <li>• Google</li> <li>• Microsoft</li> </ul>	<ul style="list-style-type: none"> <li>• Apple</li> <li>• Samsung</li> <li>• Motorola</li> <li>• HTC</li> <li>• LG</li> <li>• Sony</li> <li>• RIM</li> <li>• Nokia</li> </ul>	<ul style="list-style-type: none"> <li>• Wintek</li> <li>• TPK</li> <li>• Balda AG</li> </ul>

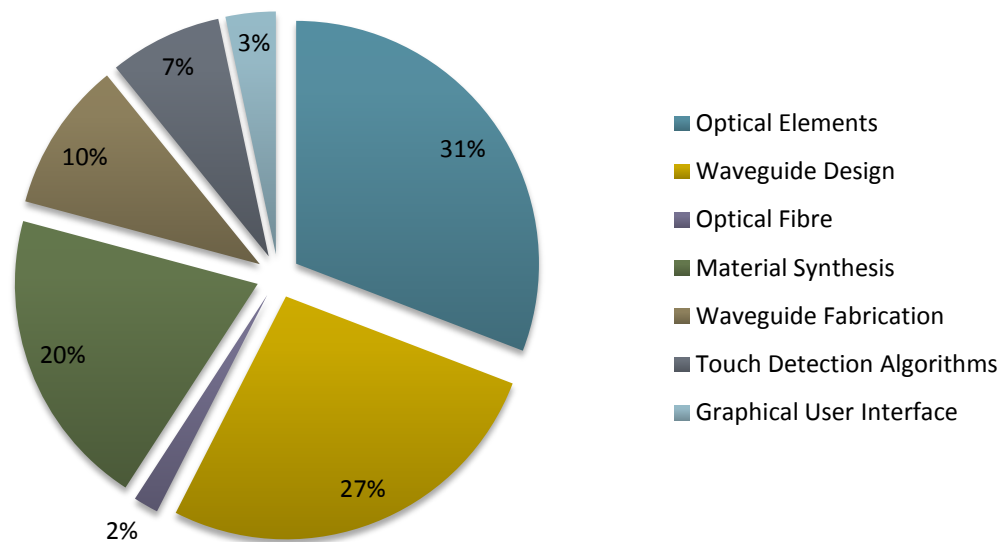
There are, moreover, areas other than smartphones and tablets where the RPO portfolio will find applications:

Retail	Portable devices	Industrial	Media
<ul style="list-style-type: none"> <li>• Point of sale systems</li> <li>• Information Kiosks</li> <li>• Digital signage</li> <li>• ATMs and Banks</li> <li>• Bill payment counters</li> </ul>	<ul style="list-style-type: none"> <li>• GPS navigation devices</li> <li>• Portable gaming consoles</li> </ul>	<ul style="list-style-type: none"> <li>• Industrial control systems</li> <li>• Healthcare</li> </ul>	<ul style="list-style-type: none"> <li>• Soft interfaces for digital media devices</li> <li>• Soft interfaces for audio/video editing</li> </ul>

### PORTFOLIO CLASSIFICATION

Based on per-patent analysis and prior expertise in touch-screen technology, iRunway devised the following taxonomy for classifying the RPO portfolio. The number of patents and applications under each category are shown in parentheses.



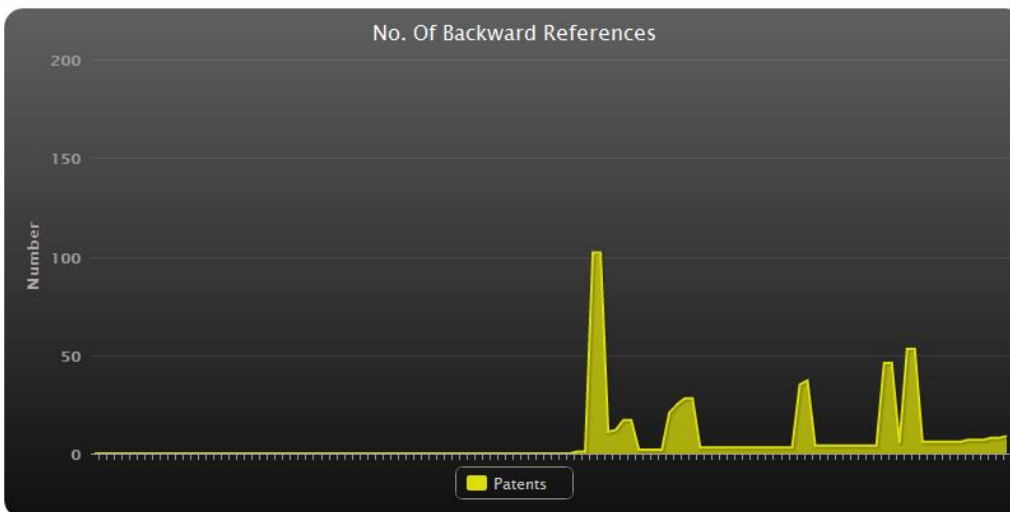
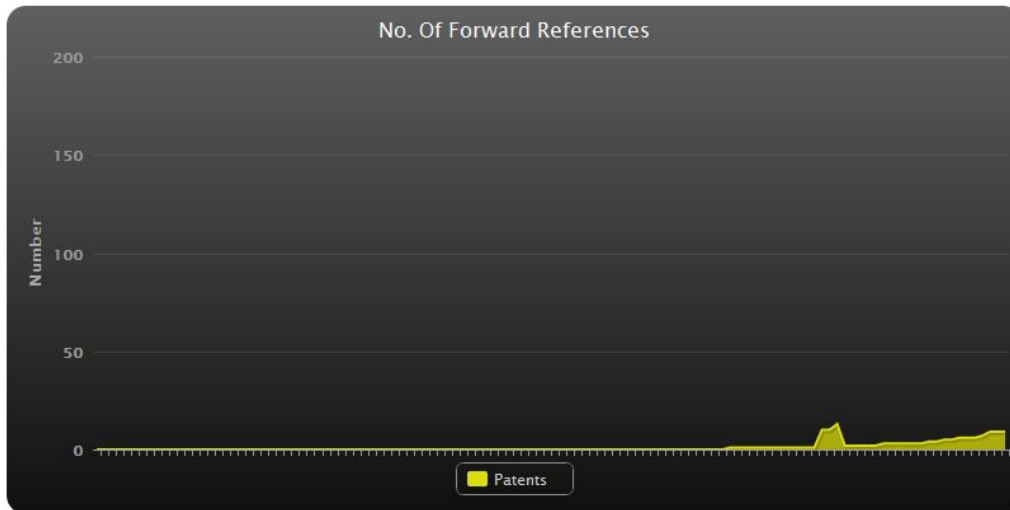
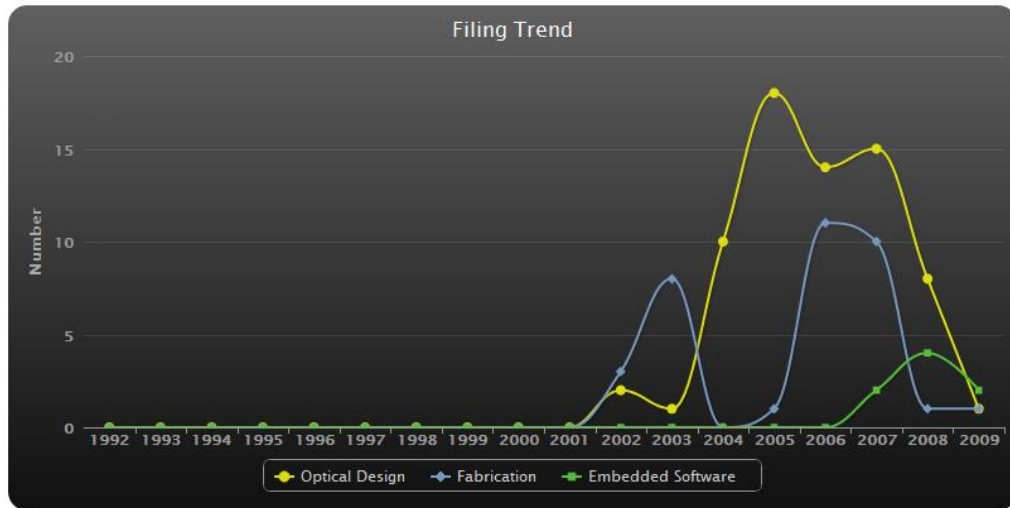


A major portion of the RPO portfolio relates its unique DWT technology, however many of these patents are generic to touch screens. In particular, RPO owns over 70 patents which deal with design of “Optical Elements” and “Waveguide Design”, including optical splitters, collimation elements, redirection elements and planar lenses for use in waveguide-based touchscreens. While intended primarily for DWT, some of these patents will apply to all next-generation touchscreens and may prove valuable to the market within a couple of years.

Notably, RPO owns a number of patents which detail the fabrication processes for various components of DWT. For instance, “Material Synthesis” includes patents related to polymeric optical materials suitable for use in waveguide-based optical touch screen sensors while “Waveguide Fabrication” includes patents around fabrication of optical waveguides using a photo-curable polymer. These patents will be valuable for a buyer who will invest further in RPO’s DWT technology, especially if combined with purchase of RPO’s manufacturing equipment.

At the same time, even though small in number, RPO’s thirteen embedded software patents are equally important for the upcoming auction. These patents are generically related to “Touch Detection Algorithms” and “Graphical User Interface” in touchscreen devices and will be contentious for purpose of future litigations and licensing in the smartphone and tablet industry.





Source: COMPASS<sup>SM</sup>, iRunway's Patent Portfolio Analysis Tool, [http://i-runway.com/services\\_ppa.html](http://i-runway.com/services_ppa.html)

## PATENT STRENGTH ANALYSIS

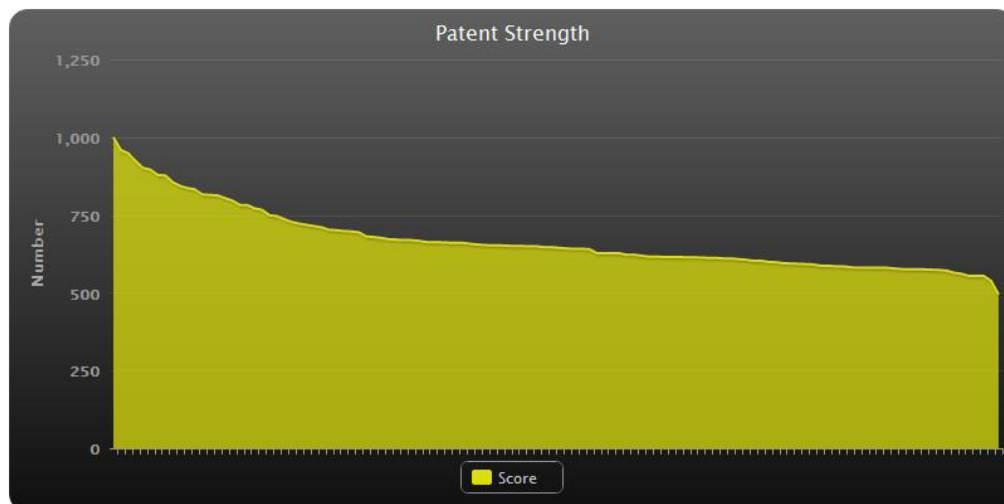
iRunway embodies years of experience with patent litigation support and IP monetization into Analytic Hierarchy Process (AHP) based patent ranking algorithms. Each patent is ranked according to more than 20 parameters, broadly categorized under three heads:

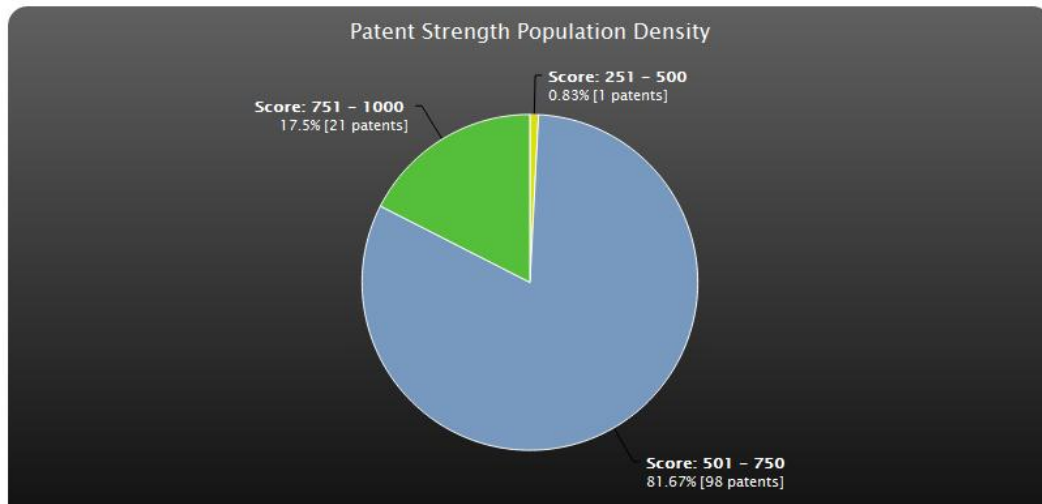
1. Technological Value of the Patent
  - a. Assignee-based parameters such as family size and number of geographies covered
  - b. Counsel-based parameters such as independent claims
  - c. Peer-review parameters such as forward and backward citations
2. Legal Value of the Patent

Parameters such as age of the patent, ease of detecting infringement which directly influence a patent's strength in litigation
3. Commercial Value

Parameters such as market size and age of the patent which directly influence licensing revenues from the patent

iRunway's proprietary patent portfolio analysis tool, COMPASS<sup>SM</sup> shows the following patent rank distribution in the RPO portfolio:





RPO has a healthy patent strength profile, with 99% of its intellectual property lying between strength scores 500-1000. 18% (21 patents) of its portfolio lies in the high strength zone of 750-1000 indicating a high technological value of these patents. The high strength profile is even more remarkable considering the low number of forward citations to the RPO portfolio (since the DWT technology is new and yet to be commercialized).

### CONCLUDING REMARKS

The RPO auction will undoubtedly fuel the ongoing smartphone/tablet wars and is set to be highly contested not only for its technology but also for the strategic and legal advantage it will provide for the winning bidder. Even though it will not hugely upset the playing field, the importance of even incremental improvements in an instantly gratifying spec can never be undermined.

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