

**12<sup>th</sup> CHRIS MEETING**  
**Valparaiso, Chile, 23-25 October 2000**

**PRINT-ON-DEMAND NAUTICAL CHARTS**  
*(by US-NOAA)*

**The Concept** – Print-on-Demand uses large format inkjet plotters to print nautical charts. Using this approach, NOAA would update digital files of all its nautical charts each week for changes published in the Notice to Mariner. Then, print-on-demand would be used to print up-to-date charts from those files each time one is ordered. This technology not only produces a superior product but also eliminates the need for inventory, warehousing and the wasteful destruction of obsolete products. This method is in contrast to the present lithographic printing method where charts are printed infrequently in batches and warehoused to await sale, perhaps years later.

NOAA has experimented with print-on-demand technology since the summer of 1997. The investigations have shown that:

- the technology is adequate to produce a usable, up-to-date chart;
- professional mariners think the product is acceptable, while offering comments for improvement and ideas for inclusion of additional information;
- the real benefits of print-on-demand are the ability to distribute up-to-date charts and to customize charts with additional information – inventory control is a free by-product;
- NOAA is able to keep all chart files up-to-date for Notices to Mariner items on a weekly basis; and
- the technology is not yet suitable for point-of-sale printing.

**The Status** – In June, 2000, NOAA signed a Cooperative Research and Development Agreement (CRADA) with OceanGrafix, LLC of St. Paul, Minnesota. The CRADA will develop and commercialize print-on-demand technology for making up-to-date nautical charts. A CRADA is a for-profit, public/private partnership to encourage the further development, and then the commercialization of federal R&D.

In September, 2000, 45 print-on-demand charts were released for commercial sale by NOAA and OceanGrafix. This limited release is designed to measure product acceptance, price acceptance, the true cost of manufacturing in a production environment, and to test the production system. The charts are printed using up-to-date digital files every time a chart agent places an order. They are also waterproof, use a lighter, easier to read color set, have an abrasion resistant coating, and have additional information printed outside the chart neat line (tide tables, emergency numbers, frequencies, etc.) that is tailored to each chart.

Early results from this test, combined with market testing over the last year and a half, has led to a decision by OceanGrafix to begin introducing the balance of the NOAA chart suite in November, 2000. It is expected that the entire suite of 1,016 NOAA charts will be available as print-on-demand products within 6 to 12 months. Production will be at a central facility in Minnesota initially with charts delivered by overnight delivery immediately after they are printed. Technology to support printing at remote sites is part of the joint research being performed by NOAA and OceanGrafix.

Research is also being performed on a second print-on-demand product that would be suitable for a chart “subscription” service. With a subscription, a mariner would automatically receive a new chart, at the location of his choosing, whenever the chart changed. Mariners would get an average of 6 times as many charts this way, so cost is a consideration for the subscription print-on-demand chart.

Additional information on NOAA’s print-on-demand work is available at <http://chartmaker.ncd.noaa.gov/ocs/pod1/pod.htm>.

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