

# ARROW GEAR News

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## Arrow supplies components for reproduction of Wright Brothers plane

Arrow has supplied components for a reproduction of the Wright Brothers plane.

Arrow supplied two sets of sprockets for the project to the Wright Redux Association (WRA), a Glen Ellyn, Illinois based organization which is building the aircraft to commemorate the 100th anniversary of the Wright Brothers first flight which took place in Kitty Hawk, North Carolina in 1903.

WRA, a non-profit group, began the project officially in 2001, but the idea was conceived in 1999 by master woodworker Mark Miller and public relations executive Tom Norton, both of Glen Ellyn. The organization was then able to move closer to their objective with the help of funding from the Museum of Science and Industry (MSI) - Chicago, The National Geographic Society, Packer Engineering of

Naperville, Illinois, private funding, and other contributions from supporters like Arrow Gear.

The primary objective of WRA is to build a flight worthy accurate copy of the plane that flew four times on December 17, 1903. Construction of the aircraft, which has been named the "Spirit of Glen Ellyn", began in Miller's woodworking shop. After obtaining support from Packer Engineering, the project was moved to a hanger owned by Packer Engineering at Clow

International Airport in Bolingbrook, Illinois.

To date, the main structure of the aircraft has been assembled and has undergone lift tests by being tethered to a flatbed trailer which was towed at approximately 18 m.p.h. The engine is currently being manufactured by Packer Engineering. According to WRA, a manned engine-driven flight is anticipated in the near future.

*See, "Wright plane" page three*

*Arrow supplied sprockets to the Wright Redux Association for their reproduction of the Wright Brothers plane.*



# Arrow launches new Website

In January, Arrow launched its new Website. Consisting of a completely new design, enhanced content, and additional user functionality, the site will provide visitors with a full range of information on the company.

Modification work on the Website, which began in the fall of 2002, targeted the goals of providing a web-based source for information on Arrow Gear, as well as providing an interaction channel for Arrow's customers, vendors, and employees.

Visitors to the new Website are initially presented with an

animated introduction. Upon entering the site, visitors have the option of navigating to several topical areas.

In the overview section, visitors can view information about Arrow's history, industry certifications, product applications, training, and other orientation to the scope of the company.

In the capabilities section, more technical information is provided on the full range of

Arrow's manufacturing processes. This area encompasses Arrow's advanced technology for design and development of gearing, size ranges, and the various types of machining performed by Arrow. Information on Arrow's heat treatment department, the CCM Closed Loop system, and complete gearboxes is also accessible. In addition, from this section, a detailed



Arrow's new Website features a redesigned interface and a full variety of information on the company.

presentation on Arrow's system for design and development can be viewed.

Also contained in the products section is detailed information on Arrow's custom gears, stock gears, and complete gearboxes. From this section, the site provides extensive information on Arrow's stock gear products - including copies of DXF files for use in customer's CAD systems. In addition, a photo gallery of a variety of Arrow's products is included.

Arrow Gear has developed numerous printed publications, videos, and interactive multimedia titles to communicate the scope of the company's products and services. Many of these materials are now available for viewing online in the publications, multimedia, and download sections. As for the video and multimedia titles, copies can now be ordered online.

See, "Website" page four

## High precision gears as art



In November, Arrow's CEO and Chairman of the Board, James J. Cervinka, posed by his sculpture which is comprised of gears produced by Arrow. The photograph was taken for use in a publication by Gleason Corporation. The sculpture, assembled by Arrow's maintenance department over the past 15 years, is located on the property of Arrow's Downers Grove plant.

## Wright plane

*Continued from page one*

The initial flight is expected to take place at Clow Airport, and later, the official observance flight will take place on the lawn of the MSI on December 17, 2003. Once flown, the machine will be hung in the Great Hall of the MSI.

Arrow's involvement with the project began when John Nowicki of Packer Engineering approached Arrow for assistance in acquiring the sprockets for use in the engine's timing assembly and for transmitting power from the engine to the propellers.

In keeping with the project's objective of remaining true to the Wright Brother's original design, Arrow's design engineering department was faced with the challenge of meeting the aircraft's 100 year

old specifications. For the engine's timing chain sprocket, Arrow was able to modify a stock sprocket, requiring the turning of the hub and the addition of several slots. The sprocket for transmitting power from the engine to the propellers was more involved. The specified chain was an obsolete design and a suitable sprocket was not available. To facilitate this, Arrow fabricated the sprocket from scratch by first creating the design in Arrow's Unigraphics CAD system and then fabricating the part in a CNC machining center. Arrow also supplied threaded washers for mounting the sprockets. In December of 2002, Arrow supplied

WRA with 2 sets of the required components.

Arrow has been called upon on other occasions to supply products for specialty projects. In 1988, Arrow produced a spiral bevel gear set for the first human powered aircraft in the Daedalus project.

More information on the Wright plane project can be obtained by visiting WRA's Website at [www.wrightredux.org](http://www.wrightredux.org).



*Arrow supplied sprockets for the Wright plane's engine and propellers.*

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## Multimedia program on gear installation procedures in production

For high precision gears to operate properly in their final application, various details must be considered during their installation. To assist Arrow Gear's customers in this process, a new multimedia program on the subject of gear installation is in production.

The program will highlight the key attributes critical to proper installation. These include mounting distance,

marked teeth, backlash, and contact pattern. In the program, viewers will receive a conceptual orientation of these subjects as well as practical step-by-step procedures to follow.

Included on the CD-ROM version of the program, technical support documents will be provided in Adobe PDF format. In addition, based on the needs of the customer, a VHS videotaped version of the

program's content will also be available.

Completion of the program is currently scheduled for second quarter of 2003. Once completed, notice will be posted on Arrow's Website, and copies can be ordered from the multimedia section. Alternatively, copies can be obtained by contacting Arrow's Design Engineering Department at (630) 969-7640.



## Website

*Continued from page two*

Finally, a contact section is provided, with specific links to customer support, quality assurance, engineering, personnel, and others. Customers can also request a quote - starting the process by completing and submitting a form of detailed information on their application. Also featured in this area is a contact channel for vendors who would like to join Arrow's online vendor database. This database will be compiled and reviewed in the assessment of new vendors as needs arrive.

Following the initial launch of the new site, plans for new features are underway. Upcoming features include an area specifically for Arrow's employees. In addition, the capability for video streaming of Arrow's orientation programs is under consideration. ❖

## Arrow Gear Newsletter Online

The Arrow Gear News is available online at Arrow's updated Website at [www.arrowgear.com](http://www.arrowgear.com).

To access the current issue, as well as past issues, go to the publications section and select newsletter. From this page, you can select the desired issue for viewing in Adobe PDF format. This page also provides a summary of articles in each issue. ❖

## Arrow's design capabilities featured in Gear Technology

In January, Arrow's advancements in the design and development of bevel gears was featured in Gear Technology Magazine.

The technical article provided detailed information on Arrow's processes for gear design and the technology involved. As an introduction, the concepts of contact pattern and gear displacement were addressed to highlight the challenges of the process. In addition, a summary of the conventional trial and error method was delineated.

The article then introduced the reader to the key components of Arrow's system. These components include Gleason's G-AGE, CAGE, MINIGAGE, Loaded TCA and T-900 Finite Element Analysis software packages. In conjunction with the software, Arrow also utilizes Gleason's Phoenix® CNC Tooth Cutters, CNC

Tooth Grinders, and a Zeiss Höfler CNC Gear Inspection System.

The dramatic attribute of Arrow's system is that the costly trial and error process of predicting gear performance is eliminated through computer modeling. The article examines the steps taken by Arrow engineers in performing this work.

Copies of this article can be obtained online. For a copy from Gear Technology, please visit their Website at [www.geartechnology.com](http://www.geartechnology.com) and select the link to their Gear Technology Magazine Online page. A copy can also be obtained from Arrow's Website by visiting the publications section, and then selecting articles.

Arrow wishes to thank the editorial staff at Gear Technology for their assistance in the publication of this article. ❖

## Arrow Gear News

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