UK Sailmakers AccuMeasure - Version 03a, December 2003
Reference Manual

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1. INTRODUCTION TO ACCUMEASURE

UK Sailmakers' AccuMeasure is a valuable tool for all sailors. With it, you can view pictures of your sails on your computer and take measurements directly off the image. Using digital technology and an easily manipulated high-tech program, you have a state-of- the-art measurement and analysis tool as a member of your team.

The program is simple to operate. There are a number of good sources of digital images of your sails. Your local UK Sailmakers lofts are ready to help you analyze your results.

2. BENEFITS OF SAIL SHAPE ANALYSIS

All serious racing programs systematically measure sail shapes. Successful America's Cup campaigns and club champions alike understand the importance of measuring, tracking, and understanding performance characteristics.

Cruising Sailors can benefit from measuring, analyzing, and understanding sail shape as much Performance Racers. An improperly trimmed or blown out sail hurts cruising performance, makes your boat heel uncomfortably, and limits your cruising range.

AccuMeasure helps take the guesswork out of trimming and tuning. You will learn how to really look at sails. You will be able to train your crew using real measurement data. Take pictures when you're going well and include them in your crew de-briefing. How much backstay tension did you apply for an optimum shape? Track your inventory over time. Can you add life to your sail with a re-cut? Or is it time to get that new sail you're thinking about? Is the mast set up correctly? Now you can use a picture to communicate with your sailmaker. The picture tells the story and you can objectively evaluate a sail together.

Your local UK Sailmakers are experts at tuning and analyzing sails using AccuMeasure. With UK's tool on your boat and our experts helping you interpret the results, you'll soon be racing faster and cruising more comfortably.

3. MEASURING and TRACKING SAIL SHAPE

Sail Shape is often difficult to describe in words. "Flat" or "Round", are very subjective terms, for example. With a picture and measurement tools, you can quantify and communicate the exact appearance of your sail. Your sailmaker and you will be looking at the same picture and will be able to objectively review and discuss your sail. (Note, digital images are easy to e-mail.)

Often, the most useful measurements from sails are comparative ones. Measure and compare the changes in the shape of your sail in different conditions and with different settings. Take a picture when you're going well. Work with your crew to recreate the shape you had. Take a picture when you're not going well. Work with your crew to see where you can make corrections.

Measure and keep a record of the fast sails in your inventory, and track the changes in their shape as they age. How much straighter is it off the headstay? How much rounder in the back? Talk to your UK Sailmaker about whether a recut or replacement is needed.

Compare different sails in your inventory. Are the differences in shape appropriate for the different ranges for which the sails are intended? Shape analysis can help explain why one sail in your inventory performs well and another doesn't.

4. OPERATING ACCUMEASURE

Standard WINDOWS menus and conventions are used. Basic navigation will be familiar and simple. FILE, VIEW, IMAGE, and TOOLS menus have image specific functions.

FILE - contains the functions for opening, saving, and printing image files. Most common image formats and variations are supported. However it is recommended that you save your images using the ".UKI" format, as this format will also save the measurement tools.

AccuMeasure also supports Twain protocol so images can be loaded directly from a Twain device. (We often load pictures from digital cameras directly into a laptop computer running AccuMeasure and analyze the sails right on the boat.)

The "File Open" box has a button near the upper right corner that enables previewing. When previewing is enabled you can quickly see a small image of a file by clicking on the file name, without having to open the file. The "File Info" button at the left of the "File Open" box can be clicked to get information about a file and its format.

The "Browse" command finds and displays small views of all of the images in a directory. This operation may take a bit of time to complete. Click on any image in the Browse window to open the full size image.

Note on Printing: If the splines do not print with your printer drivers, an alternative is to do a screen capture (ALT+SCREEN PRINT) and paste the image into a document.

VIEW - contains functions that control how the image is displayed. You can Rotate, Flip, Zoom, or "Fit the image to the window". The Right Mouse Button can be used to dynamically zoom in on a portion of the image. Hold the Right Button down and drag a rectangle around the area you want to see. This can be done repeatedly to zoom to closer levels. Double-clicking the Right Button backs up to the previous zoom level. Double-clicking a second time "fits to window" displaying the entire image. Dynamic zooming is very useful when you are positioning measurement tools. The right edge and bottom edge of the view can be pulled away from the image to give you a working area larger than the image itself.

IMAGE - contains functions to enhance and improve the quality and detail in poor images. Brightness, Contrast, Gamma Correct, and Histogram Equalize actually change the image in memory. UNDO can be activated and will allow you to go back one step. Turn this on before you make changes to an image. It doubles memory used, so we advise turning it on only when you need it.

TOOLS - contains the measurement tools for measuring camber, mast bend, or any other curve. They can also be turned on or off using the tool bar buttons. Labeled "Top", "Middle", and Bottom", they can actually be used in any location. In addition, "Information" identifying the sail and the sailing conditions can be recorded and saved with the image.

The measurement tools are Bezier Splines, which are the same type of splines we use in our AccuCut Sail Design Program to define the shapes of the 3D sail molds. The Bezier Curve tends to be drawn toward the Control Points of the tool. Use the Left Mouse Button to grab the control points and move the tool around the screen, change the shape of the curve, and position it over a draft stripe or seam on the sail. The tool will stay in place when you scroll or zoom. Data is displayed in the control box. The box can be moved or closed. HINT: the curve itself can be turned off from within the databox, which can be helpful in positioning the max draft location. The angle shown as "Twist" is the angle of the spline tools chord line relative to horizontal. This can be used to find the difference in twist angle between two spline tools.

5. SAIL SHAPE TERMS

These basic definitions will help you understand the keys to shape analysis and will be part of the dialog when you are analyzing your sail.

CROSS SECTION or SECTION, The shape of a sail is usually measured at several Cross Sections. A cross section is the shape defined by a Draft Stripe or a horizontal cross-wise seam on the sail. CHORD LINE, is the straight line from the Luff to the Leech across a Section.

CAMBER, is the depth of the Section from the Chord Line.

MAX CAMBER, is the depth of the Section at it's deepest point. This is expressed as a percentage of the Chord Line Length, e.g., the depth of a Section with 16% Camber is .16 X the Chord Length.

DRAFT POSITION, is the position along the Chord Line of the Max Camber point, again expressed as a percentage of the Chord Line Length.

15% CAMBER, is the depth of the Section at a point 15% along the Chord Line from the luff. In AccuMeasure, it is given as the ratio of the depth at the 15% Chord to the depth at the Max Camber point. It is a measure of the roundness or flatness of the entry of the sail.

75% CAMBER, similar to "15% Camber", it is the depth of the Section at a point 25% from the leech, and is a measure of the roundness or flatness of the back end of the sail.

TWIST, is the angle of the Chord Line. In sail design, Twist is measured as the angle of the Chord Line from the centerline of the boat. The Twist angle is greater in Sections high in the sail than down low. The important measure is the difference in Twist between Sections. In AccuMeasure, Twist is measured as the angle of the Chord Line relative to horizontal on the screen, and the difference in Twist between Sections can be calculated.

6. SETTING UP AND CAPTURING A GOOD SAIL IMAGE Set up the boat and all sails in full-on racing trim. Mainsail trim affects genoa shape, and vice versa, so it is important that the boat as a whole be set up properly. You won't learn much from analyzing poorly trimmed sails.

Sail the boat for several minutes, adjusting the sails until they are at their best trim and the sailing is steady. Then, take your pictures. It is a good idea to take several pictures of each sail. Shape changes noticeably when the boat is sailing a bit high or low, or coming off a wave.

The standard ON THE BOAT picture is taken from the mid-foot of the sail, as close as possible to the sail, looking up toward the head. For Genoas, get as far to leeward and as low as possible (even lying on your back next to the sail). For mainsails, position the camera just to windward and under the middle of the boom.

It is usually difficult to get all of the bottom draft stripe in the picture. A slightly wide angle lens (35 - 40 mm) works best. Too wide a lens causes distortion and a narrower one does not get enough of the sail. If possible, try to get at least one end of the bottom draft stripe in the picture. AccuMeasure lets you position the measurement tool off the edge of the picture on the other side.

Other angles that can be useful are a shot taken from the bow looking almost directly into the entry of the genoa, to judge the evenness of the entry. You should be able to see a bit

of the leeward side of the sail off the headstay as you look up toward the head. A shot from the leeward corner of the transom looking up the leech of the genoa shows how it follows the rig.

Pictures taken from OFF THE BOAT are also very useful, if you have a chance to take them. To measure leech position, position the camera directly behind the boat with the mast and headstay in line, and then just to leeward with the genoa tack and clew aligned.

7. SOURCES OF DIGITAL IMAGES

AccuMeasure can read most common digital formats. You should easily be able to find and use a standard one. In particular, almost all digital image sources and software can produce JPEG format files. There are a number of ways to create a digital picture.

DIGITAL CAMERAS are probably the most convenient source. Pictures can be downloaded directly from the camera to your computer.

Photographs or slides can be SCANNED and stored on computer disks.

VIDEO FRAME GRABBER technology allows you to create a "still" picture from your videos, but these are not very high resolution, which makes them more difficult to use.

The sharper and better exposed your photo is, the easier it will be to see the draft stripes.

8. SYSTEM REQUIREMENTS

WINDOWS version 98 or higher.

INSTALLATION

Run "IAccu03a.exe", the self-extracting executable file to install the system on your computer. This will extract all files and execute the installation program. Installation is into one simple directory of your choosing and will not add any files in your system or other directories.

UNINSTALLING

All files are placed in the directory you select when the program is installed. To uninstall, simply delete that directory and all files in it, and delete the desktop shortcut or program group.

9. TERMS and CONDITIONS of USE

Recipients of this software are granted a limited license to use the AccuMeasure Sail Digitizing software on their personal computer. It is NOT PUBLIC DOMAIN software. No files included as part of this package can be distributed apart from the total package (IAccu03a.exe).

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