

INTRODUCTION TO 2D PHOTOGRAMMETRY

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MARCO CANVAS & UPHOLSTERY LLC

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Creating more liveable spaces.

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WHAT IS PHOTOGRAMMETRY?

- THE USE OF PHOTOGRAPHY IN SURVEYING AND MAPPING TO MEASURE AND CREATE MODELS, MAPS AND DIAGRAMS.

WHAT AND HOW DOES IT HELP IN THE TEXTILE MARKETS

- CRAWL, WALK, AND RUN STEPS TO AUTOMATION. PHOTOGRAMMETRY IN MY VIEW IS ONE OF YOUR FIRST STEPS TO LEARNING CAD AND MODELING. A GOOD PATHWAY TO MORE COMPLEX CONCEPTS.
- DIGITALLY STORE AND EASILY FIND YOUR PATTERNS VS. PHYSICAL PATTERNS THAT CONSUME MUCH SPACE AND CAN BE UNRULY TO ORGANIZE OR GET LOST.
- HAVING A PATTERN IS INTELLECTUAL PROPERTY THAT ADDS VALUE TO YOUR COMPANY WHEN YOU GO TO SELL OR WHEN YOU SIMPLY NEED TO MAKE THAT PRODUCT AGAIN.
- CONVERT A PAPER PATTERN TO A DIGITAL PATTERN FOR THE PURPOSES OF AUTOMATED CUTTING OR RE-PLOT THE PATTERN TO WORK MANUALLY.

HOW DO I GET STARTED

- DESIGNATE AN AREA TO TAKE PICTURES OF PATTERNS. TRY AND PICK A SPACE THAT ALLOWS YOU TO HAVE THE CAMERA MOUNTED ABOUT 15'-20' HIGH SO THAT YOU CAN TAKE 1 PICTURE VS MANY THAT HAVE TO BE DIGITALLY SEEMED. (YOUR AVERAGE PATTERN SIZE AND LENS ANGLE WILL DETERMINE THE SPACE YOU NEED.) WE USE A 20' BY 12' SPACE THAT ALSO HAPPENS TO BE OUR FLOOR IN OUR RECEIVING AREA.
- CLEAR THAT SPACE IF POSSIBLE AND IF NOT MAKE CARTS THAT WHEEL IN AND OUT FOR A CLEARER SPACE. WE RECOMMEND PAINTING THE FLOOR A HIGH CONTRAST COLOR TO THAT OF YOUR PATTERN MARKER IF USING SEMI OR CLEAR PATTERN PAPER OR CONTRAST TO YOUR PATTERN MEDIA IF IT IS A SOLID. YOUR PATTERN LINES NEED TO CONTRAST SO THEY ARE EASILY SEEN AGAINST A BACK DROP.
- LIGHTING: A DIM LIGHT WILL NOT HELP YOU SEE YOUR PATTERN MARKS WELL. LIKE ANY PHOTOGRAPHY YOU NEED GOOD LIGHT. TEND NOT TO LIKE FLORESCENT LIGHT AS THE LIGHT PULSES AND CAN PRODUCE GRAINY OR STROBED PICTURES. OPT FOR AN LED LIGHT AND IF POSSIBLE AND IN BUDGET A FEW OF THEM. WE HAVE AN OVER HEAD AND SIDE STREET LAMP LED AS THE LIGHT IS CLEAN AND SUPER BRIGHT. STRAIGHT DOWNLIGHTS CAN REFLECT OFF OF THE SHINY CANVEX TEMPLATE PLASTIC.

GETTING STARTED

- EQUIPMENT: YOU WILL WANT TO TRY AND PERMANENTLY MOUNT A CAMERA CENTERED ABOVE THE DESIGNATED AREA. YOU WILL WANT A CAMERA WITH A MINIMUM OF 20MP AND MILD LENS DISTORTION. A FISH EYE LENS WILL SEE MORE AREA BUT HAS TOO MUCH LENS DISTORTION! WE HAVE FOUND THAT A 55MM TO 75MM LENS RANGE WORKS WELL AT 20' THE CAMERA MUST BE DIGITAL AND SHOULD BE A DSLR BODY STYLE LIKE A CANNON REBEL OR NIKON D7200.
- IF YOUR CEILING IS LOWER, OR YOU USE A TABLE, THEN DOWN TO A 20MM LENS CAN BE USED. NON-ZOOM LENS IS PREFERRED.
- A CAMERA THAT CAN BE SET UP FOR REMOTE POWER, REMOTE SHUTTER RELEASE, AND REMOTE VIEWING / IMAGE DOWNLOAD IS BEST. THAT WAY CAMERA REMAINS MOUNTED ALWAYS.

HERE IS OUR LAYOUT



20' x 12' white epoxy floor.
We use Canvex as pattern
media mainly.

25MP Cannon DSLR with
55MM to 70MM with auto
stabilization lens mounted to
ceiling. (Fans can jiggle)

USB cable from camera to a
portable laptop. Laptop
connected to our network to
file images automatically.

AC power adapter from
camera battery to 110V
outlet

LED street lamp



SOFTWARE & HARDWARE

- WE AND MANY OTHERS USE **PHOTOMODELER®** . FOR 2D TEMPLATES, THE PHOTOMODELER STANDARD IS SUFFICIENT.
- [HTTP://WWW.PHOTOMODELER.COM/PRODUCTS/MODELER/DEFAULT.HTML](http://www.photodeler.com/products/modeler/default.html)
- WE DON'T USE ANY OTHER ADD ON'S AS PHOTOMODELER IS SO POWERFUL ALONE. THEY OFFER GREAT SUPPORT AND HAVE A HUGE LIBRARY ON YOUTUBE FOR TUTORIALS.
- CAMERA CALIBRATION IS NOT TO DIFFICULT ON YOUR OWN CAMERA.
- THEY OFFER TRIAL VERSIONS TO PLAY WITH. EXPECT TO SPEND ABOUT \$995 FOR BASE SOFTWARE AND ABOUT \$700 TO \$1000 FOR A CAMERA, LENS, A LONG USB EXTENSION CABLE, AND THE POWER CORD FOR THE CAMERA. YOU DON'T WANT TO USE THE BATTERY LIKELY AS YOU WILL HAVE TO TURN THE CAMERA ON EACH TIME VS DOING SO FROM YOUR PC.
- PRE OWNED IS NEW TO YOU. WE BUY CERTIFIED REFURNISHED LAP TOPS AND CABLING FROM NEW EGG AND PRE OWNED CAMERA GEAR FROM AMAZON AND SAVED MUCH MORE! ALWAYS BUY SAME BRAND NAME PARTS LIKE THE CAMERA POWER SUPPLY AND LENS FOR A CANNON CAMERA SHOULD BE MADE BY CANNON SO THEY ARE 100% COMPATIBLE. MANY WILL SAY THEY ARE BUT YOU ARE LIKELY TO RUN INTO TROUBLE. I WOULD NOT GO THERE.

LENS CALIBRATION

- THE SOFTWARE NEEDS TO KNOW THE CAMERA SETTINGS. THE SOFTWARE, VIDEOS AND SUPPORT WILL WALK YOU THROUGH THE CALIBRATION STAGE BUT I WILL PROVIDE AN OVER VIEW OF WHAT WE DID.
- PHOTOMODELER COMES WITH PRINTED TARGETS THAT YOU CAN PHOTO COPY OR PRINT. WE SET THEM UP AT DIFFERENT HEIGHTS AND TAKE PICTURES FROM DIFFERENT ANGLES. CAMERA SHOULD NOT BE MOUNTED DURING THIS STAGE AS YOU WANT A FEW ANGLED SHOTS OF THE FIXED TARGETS SO THE SOFTWARE CAN TRIANGULATE AND CALIBRATE THE LENS. WE HAVE CALIBRATED SOME SMART PHONES BUT FIND THE FIND A FIXED POSITION WITH A DSLR CAMERA AND REMOTE CAMERA CONTROLS IS BEST FOR PAPER PATTERN TO CAD CONVERSIONS.
- IMPORT THE PICTURES AND FOLLOW THE CALIBRATION INSTRUCTIONS AND YOUR CAMERA IS NOW CALIBRATED FOR 2D AND 3D WORK!

LENS CALIBRATION EXAMPLE

Target sheets are laid out at different heights
Pictures taken from various angles.
Import pix into software and run the lens camera &
lens calibration program.



SETTING A SCALE ON YOUR FLOOR

- IT IS TIME CONSUMING TO HAVE TO SET UP SCALING TARGETS EACH TIME. SO YOU CAN CUT 8 TO 12 TARGETS OUT AND PUT CLEAR EPOXY OVER THEM. HOWEVER, WE FIND IT SIMPLE TO JUST PLACE BLACK DOTS ON OUR FLOOR AND PUT CLEAR TAPE OVER THEM. WATCH FOR LIGHTING DOES NOT CAUSE REFLECTIONS.
- WE THEN MOUNT THE CAMERA AND MAKE ADJUSTMENTS TO CAPTURE AS MUCH SPACE AS POSSIBLE AND YOU WILL WANT THE LENS AT FULL ZOOM, (NOT DIGITAL ZOOM). A NON-ZOOM LENS IS PREFERRED.
- WE THEN MEASURE THE CENTER OF EACH DOT TO EACH DOT AND RECORD THESE DIMENSIONS. WE TAKE A PICTURE OF THE BLACK DOT TARGETS AND TELL THE SOFTWARE THE LOCATION OF EACH DOT AND ITS RELATIVE DISTANCE. WE FIND A FLAT TAPE WORKS BEST IF YOU DO NOT ALREADY HAVE A 3D DIGITIZER. TAKE DIMENSIONS A FEW TIMES AND AVERAGE IF YOU ARE OFF SLIGHTLY. WITH SOME PRACTICE YOU CAN ACHIEVE ABOUT A .01 - .032" ACCURACY. THE MORE ACCURATE YOU ARE AT THIS STAGE THE MORE ACCURATE YOUR PATTERNS WILL BE.

EXAMPLES OF OUR SCALE



At the left is our main shot after the camera is mounted. NOTE: The small black dots. (This image was prior to our LED street lamp.)

The dots not only provide the extents of what the camera can see when we put a pattern down but also calibrate a known scale that the software knows based on the measurements and lens angles from calibration.

We have clear tape over the target dots so they don't get marked or removed. Like many of you we too work in a smaller space and this space sees a lot of foot traffic and products coming in and out of the shop.

We maintain by mopping, but eventually we always have to re-paint and set the scale again.

READY, SET, & GO!

- YOU HAVE DONE ALL THE HARD WORK AND NOW IT IS TIME TO USE IT. WHILE A PACKAGE FROM THE SOFTWARE CO. OR OTHERS CAN OFFER A TURNKEY CAMERA CALIBRATED YOU WILL ALWAYS HAVE TO SET THE SCALE AND WORK SPACE, CONNECT A PC, CORDS AND FULL SET UP. NOTHING WE ARE AWARE OF WILL DO THE COMPLETE WORK YOU NEED TURN KEY.
- TAKE A PAPER OR PLASTIC PATTERN AS TRADITIONAL. WE LAYOUT OURS FLAT AND WILL USE TAPE TO HOLD IT DOWN. I KNOW SOME SHOPS HAVE THE ROOM FOR A VACUUM TABLE TO HOLD THE PATTERN. THAT WOULD BE BEST IF YOU PROCESS A LOT OF PAPER.
- FOR PATTERNS LARGER THAN YOUR AREA SIMPLY MAKE MATCH MARKS ON THE PATTERN AND TAKE MULTIPLE PHOTOS. YOU CAN MARRY THE MATCH MARKS FROM ONE PICTURE TO THE NEXT IN THE SOFTWARE TO CREATE A LARGE PATTERN.

PICTURES OF SAMPLE PATTERNS



TO SAVE, ORGANIZE, AND RETRIEVE YOUR PATTERN

AT THIS TIME YOU ARE NOW ABLE TO STORE ANY PATTERN FOR SAFE KEEPING! I WOULD RECOMMEND SETTING UP AN EXCEL SHEET OR DATABASE TO TRACK WHERE YOU WILL STORE YOUR PATTERNS. ALL OF MY PATTERNS ARE STORED IN THEIR OWN FOLDER UNDER A MAIN FOLDER CALLED PATTERNS. THE CUSTOMER/PROJECT FOLDER HAS A GENERIC NAME, (E.G. – AA0001), THAT INCREMENTS UP EACH TIME, (E.G. AA0002), PER PROJECT. THIS ALLOWS FOR 10'S OF THOUSANDS OF PATTERNS TO BE STORED AND ORGANIZED FOR RETRIEVAL. THE EXCEL SHEET HAS A LINK TO THE FOLDER WHERE ALL THE DATA IS IN FOR THAT PROJECT, AND LISTS OTHER SEARCHABLE INFORMATION LIKE CUSTOMER, YEAR, MAKE, MODEL, ADDRESS, HULL ID, ETC., ETC.. WE CAN USE THE FIND FEATURE IN EXCEL TO SEARCH FOR ANY OF THE DATA AND THEN CLICK THE LIKE TO ARRIVE AT THE FOLDER WITH ALL THE DIGITAL INFORMATION IN IT.

A	B	C	D	E	F	G	H	I	J	K
Director	QB Est.	Product Type	Sub-Category	Make	Model	Year	Hull ID/ Reg.#	Customer	End User	Address
556	AA0565	13752	Marine	Bow Pad and cover	Sea Ray	340 Sundancer	2007	Tim Dill		190 Geranium Ct
565	AA0564	13910	Marine	Bimini Top	Boston Whaler	210		Nilka Connell		Walker's Hideaway Marina
566	AA0565	13793	Marine	Leaner and Backrest Cover	Cobia	23' CC	2007	Arthur Asdourian		Calusa Marina
567	AA0566	13520	Marine	Enclosure	Pursuit	23CC	2003	John Busch		571 W Elkhorn Cr
568	AA0567	13778	Marine	Liberty Mooring Cover	Pathfinder	2200 V	2003	Gary Paulson		1731 Bounty Ct
569	AA0568	13838	Marine	Snap Down Cover	Premier	Pontoon	1999	Jack Miller		605 Sunset Dr
570	AA0569	13860	Marine	Mooring Cover	Carolina Skiff	23 Ultra Elite 55	2015	Denise Snyder		102 Tahiti Cir
571	AA0570	13778	Marine	Console Cover Under T	Sea Hunt	Gamefish 25' CC	2018	Rose Marina	Tom Simmons	991 South Collier Ct
572	AA0571	13662	Marine	Dodger and Hand Rail Covers	Tayana	37 Sailboat	1990	Captain Erik Levine	George Jachode	Naples City Dock
573	AA0572	13820	Marine	Enclosure and Aft Curtain	Pursuit	2570	2006	Gary Damerow		489 N Barfield
574	AA0573	13697	Marine	Mooring Cover	Boston Whaler	Dauntless 240	2015	Skip Endicott		481 Pheasant Ct
575	AA0574	13849	Marine	Outdoor Kitchen Cover				Ben Mast		4919 Coach Ln Naples, FL
576	AA0575	13524	Marine	Mooring Cover and Trombone	Sportsman	Heritage 231	2018	SMNSH623K516		295 Channel Dr Naples, FL
577	AA0576	13816	Marine	Enclosure	Parler	2501		Collier County Sheriff		990 N Barfield Dr
578	AA0577	13821	Marine	Enclosure	Lake and Bay	22'		Collier County Sheriff		990 N Barfield Dr
579	AA0578	13808	Marine	Mooring Cover and Console Under Tee	Nautic Star	231 Coastal	2016	Porter Little		1640 Galleon Ct
580	AA0579	13803	Marine	Mooring Cover	Sea Born	LX22 CC	2016	SVTL20051516		719 Nautilus Ct
581	AA0580	13770	Marine	Mooring Cover	Harris Kayot Legend	Twin Hull 24' Deckboat	2002	HAMD4517F102		1843 Menorca Ct
582	AA0581	13894	Marine	Liberty Mooring Cover	Hydrasports	Custom 34' CC	2016	George Meneta		1270 Aruba Ct
583	AA0582	13861	Marine	Liberty Mooring Cover	Mainship	39' Cruiser	2008	MPTG504F708		43 N Barfield Dr
584	AA0583	13396	Marine	Bimini Top	Hurricane	Sun Deck S0280	2009	Denina Milliano		1180 Whiteheart Ct
585	AA0584	13866	Marine	Mooring Cover	Regulator	CC 25'	2015	Christopher & Katrina Hall		1880 Sandpiper St Naples, FL
586	AA0585	13900	Marine	Hatch Cover	Sea Ray	Sundancer 280	2011	Sam Borodinsky		1421 Cutler Ct
587	AA0586	13858	Shade	Canopy Cover				Somerset Condo		780 S Collier Blvd
588	AA0587	13907	Marine	Enclosure	Sailfish	325 DC	2016	Rose Marina	Steve Mahall	Naples Harbour Yacht Club
589	AA0588	13935	Marine	Table Top Cover	Ferretti	83		Sherry Quinn		951 Bald Eagle Dr
590	AA0589	13874	Marine	Console Cover Under Tee	Sea Hunt	Gamefish 27	2013	Wally Quinn		1783 Piedmont Ct
591	AA0590	13931	Marine	Alt Frame Padding				Scott Gibbs		823 Rose Court
592	AA0591	13899	Marine	Bimini Top	Stammoth	28' CC		Brad and Teresa Gango		194 Trinidad Naples, FL 34113
593	AA0592	13771	Marine	Canopy Cover	Monroe	41'		Bill Doster		401 School Dr West Everglades City
594	AA0593	13971	Shade	Chimney Cover		9'Wx8'9" Lx50'H		Island Construction		1549 Heights Ct
595	AA0594	13922	Marine	Tee top recover	Freeland	CC w/ cuddy	1998	AP Builders		1107 Edington Pl
596	AA0595	13826	Marine	Mooring Cover	Chris Craft	Launch 28	2016	S Stefan Krammer		1861 Galeon Ct
597	AA0596	13862	Marine	Liberty Mooring Cover	Hurricane	SD 280	2008	US-GOV74155L708		141 Leonard Ct
598	AA0597	14013	Marine	Mooring Cover	Sailfish	240 CC	2015	YSIG0095J515		951 Bald Eagle Dr
599	AA0598	13892	Marine	Snap Down Cover	Sweetwater	180 Tuscany Series	2008	Dennis Baker		319 Henderson Ct

WORKING A 2D PATTERN

- YOU NOW HAVE A DIGITAL PICTURE THAT CAN BE IMPORTED INTO PHOTOMODELER. AS YOU CAN SEE FROM THE PATTERN EXAMPLE WE TEND TO NOT FINISH DRAWING ALL SEEM ALLOWANCES AND OTHER DETAILS ON OUR PAPER PATTERN. WE DO THIS NOW IN CAD. YEARS AGO WE WERE SLOWER AT CAD AND SOMETIMES WE WOULD JUST TAKE THE PHOTO TO SAVE THE FULLY WORKED PATTERN AND SIMPLY WORK THE PATTERN MANUALLY AND THAT WORKS FINE.
- HOWEVER, JUST LIKE SEWING YOU GET FASTER WITH EXPERIENCE AND TODAY WE CAN DRAW FASTER IN CAD THAN A HUMAN CAN MANUALLY AND WHEN WE WORK A PATTERN IN CAD WE HAVE THE BENEFIT OF SENDING TO THE CUTTER AND PLOTTER, KNOW THE EXACT YARDAGE NEEDED BEFORE WE ORDER, CUT AND MARK ALL MATERIALS AND REINFORCEMENTS AND THEN PRE KIT ALL THE ZIPPERS, BINDING, FASTENERS ET AL IN A REPURPOSED DRUM OF SHEET GOODS. A SEWING MACHINIST WILL NEVER HAVE TO LEAVE THEIR SEWING STATION. EVERYTHING THEY NEED IS THERE AND READY AND NO BAD BACK LEANING OVER CUTTING TABLES MAKES FOR HAPPY WORKERS!

HOW TO WORK A PATTERN

- AT THIS TIME AUTOMATIC DIGITIZING OF LINES AND EDGES IN PATTERNS IS NOT VIABLE BY SOFTWARE. SOME OF THESE METHODS PRODUCE **INFORMATION OVERLOAD**.
- IT DOES NOT KNOW WHAT YOU WANT AND WHAT YOU DON'T WANT IN THE PICTURE OF YOUR PATTERN. SOFTWARE CAN PICK UP EDGE DETAILS BUT WE HAVE FOUND THESE TO BE MISLEADING AND IT MAKES MISTAKES! SO WE TELL IT WHAT WE WANT AND WHAT WE DON'T. NOT THE OTHER WAY AROUND. WE FIND IT MORE ACCURATE, FAST AND EASY TO TELL THE SOFTWARE WHAT WE WANT AND DON'T. THE SOFTWARE KNOWS THE SCALE OF THE PATTERN BY THE POSITION OF THE FIXED TARGETS THAT ARE SCALED AND YOUR CAMERA THAT IS CALIBRATED. SO YOUR PICTURE OF YOUR PATTERN IS SCALED EXACTLY AND THIS IS WHAT MOST THINK IS PATTERN RECOGNITION. HOWEVER, IT IS ONLY SCALED. WE HOPE THAT FUTURE DEVELOPMENTS OF AUTOMATIC TRACING WILL IMPROVE TO REMOVE SOME OF THE MORE TEDIOUS WORK.
- IMPORT YOUR PATTERN PHOTO INTO THE SOFTWARE. PICK OUT THE CENTER OF AS MANY TARGETS AS YOU CAN SEE WITH YOUR MOUSE. THE SOFTWARE WILL GUIDE YOU STEP BY STEP AND THIS ASSURES THE SCALE IS SET, & THE CAMERA SELECTED IS CALIBRATED.

HOW TO WORK A PATTERN

- USING PHOTOMODELER BEGIN TO TRACE OUT YOUR PATTERN WITH A MOUSE. AT THIS STAGE OR IN CAD YOU CAN ADD MORE LINES, (CUT, SEW, TICK, REINFORCEMENTS, ZIPPERS, ETC.), OR CONNECT LINES AND WORK THE PATTERN LIKE YOU WOULD BY HAND TO FINISH IT OFF. WE TEND TO JUST TRACE OUT WHAT WE HAVE AND THEN IMPORT THE FILE INTO 2D CAD TO DO THE FINAL WORK AS WE ARE FASTER IN CAD THAN IN PHOTOMODELER.
- IN CAD WE ADD IN ALL DETAILS AND THEN DESIGN THE NESTED CUT FILE AND DESIGN A SEWING MAP SO THAT **ALL PARTS** CAN BE CUT & SEWN TOGETHER. AGAIN EVERYTHING IS GIVEN TO THE SEWER SO THEY JUST SEW! NEEDLES GOING UP AND DOWN = \$\$\$\$

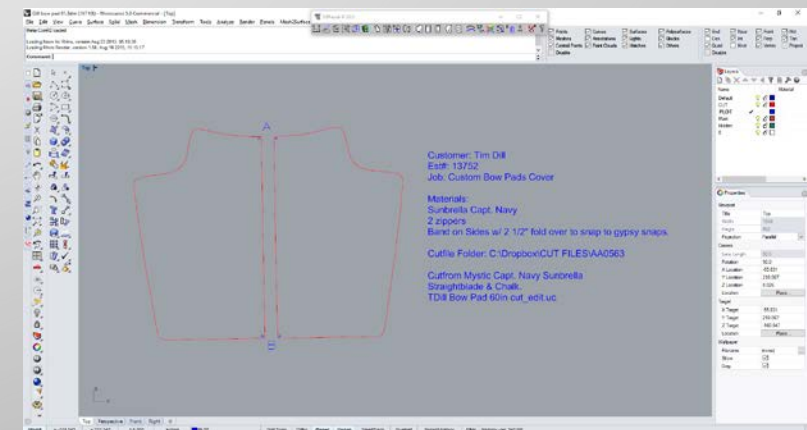
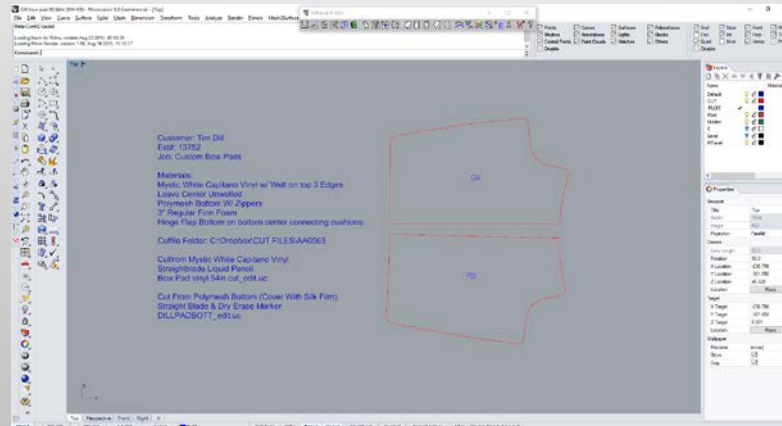
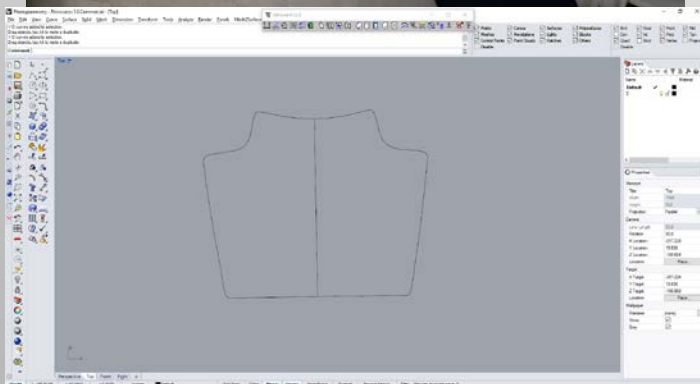
SAMPLE: BOW PAD AND BOW COVER PATTERN



Counter Clockwise from top left:

- Added front and back track
- Took paper pattern
- Took picture of pattern
- Traced in Photomodeler and cleaned in CAD
- Designed for upholstery
- Designed cover for upholstery.
- CNC Cut & Plot
- Sew all
- Install all

Sorry pic only with cover on! Upholstery is sweet too as I saw it on the bench



SAMPLE: BOW PAD AND BOW COVER PATTERN

3”T Cushions have a fabric hinge and folds in half with a mesh back for drain.

Tracks holds cushion and cover fore and aft.

Upholstery zips onto Keder & track on top and bottom.

Under snap tabs on upholstery with Gypsy snaps holds the sides.

Sunbrella cover zips on with double zipper top and bottom on the Keder welt.

Undersides of upholstery fasten to boat and cover snaps on sides to tabs under the cushion for a clean look.

All was designed in CAD, CNC cut and plotted and all materials were pre-kitted and given to a sewer. The plastic pattern was used to mark & cut the 3” foam. All was sewn and then delivered to boat and installed.

The process is faster, repeatable and produces quality goods. Not one person, knows the entire process and fear of training your next competitor is gone. With more practice you will become fast and good. Just as you have learning to pattern and sew. Next steps are to learn 3D CAD and 3D templating.



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BACK GROUND

I HAVE SPENT THE PAST 8 YEARS IN THIS TRADE, (MAY 2008). WHILE MARCO CANVAS IS PART OF MY FAMILIES BUSINESSES SINCE 1920, I RARELY SPENT ANY TIME IN THIS TRADE AS MY FATHER DISCOURAGED ME FROM THIS WORK AND I LEARNED METAL WORKING AND PROCESS ENGINEERING. AFTER GRADUATION & WITH SO MUCH WORK LEAVING THE USA I SPENT MOST OF MY TIME TRAVELING THE GLOBE WHERE I BECAME A GLOBAL BUSINESS MANAGER FOR KENNAMETAL INC. (NYSE = KMT), AND HELPED COMPANIES DESIGN, IMPROVE AND SET UP COMPLEX MANUFACTURING PROCESSES. IT WAS A VERY REWARDING CAREER BUT TOO MUCH TIME AWAY FROM HOME AND YOUNG KIDS STEERED ME BACK HOME AND TO MY FAMILIES BUSINESS WHICH MY FATHER WAS CLOSING IN 2008 WITH A LOYAL STAFF OF 3. WE TOOK A GAMBLE IN THE WORST ECONOMY AND BOUGHT MCU LLC. MY GOAL EVER SINCE HAS BEEN TO AUTOMATE AND TURN THIS BUSINESS FROM A TRADE/ART TO THAT OF SCIENCE AND MATH. I SEE IN THIS TRADE WHAT I SAW HAPPEN TO MAIN STREAM MANUFACTURING AND THE ONLY WAY TO COMPETE IS TO HAVE THE BEST PRODUCT, IN THE FASTEST TIME AND AT A MARKET RATE ACCEPTABLE. TO LEARN THIS TRADE OVER THE PAST 8 YEARS I HAVE COUNTED ON MANY OF YOU. I HOPE THIS HELPS YOU AND YOUR SHOP REACH YOUR DREAMS. IT HAS HELPED US AND WE NOW EMPLOY A STAFF OF 18 PERSONS IN DIVERSE TALENT, (YOUNGEST IS 20 AND OLDEST IS 66), AND WE ARE STILL TAKING MARKET SHARE. GOING DIGITAL IS NOT FOR EVERYONE AND I KNOW THAT, BUT IF IT IS ONE YOUR TO DO LIST JUST UNDERSTAND IT IS A COMMITMENT WITH MANY OBSTACLES. I AM CERTAIN NO ONE LEARNED THEIR SKILLS OVER NIGHT. GOOD LUCK AND GOD BLESS!

SINCERELY,

EDWARD J SKRZYNSKI (OWNER)

MARCO CANVAS & UPHOLSTERY LLC

