

Mechanical Design of a Sonar Mount for an Unmanned Surface Vehicle

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Thesis submitted to the Faculty of the
Virginia Polytechnic Institute and State University
in partial fulfillment of the requirements for the degree of

Master of Science
In
Mechanical Engineering

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September 22, 2015
Blacksburg, VA

Keywords: Mechanical Design, Sonar Mount,
Unmanned Surface Vehicle

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Fair use checklist for Ribcraft 4.8T in Fig. 2.2

Virginia Tech ETD Fair Use Analysis Results

This is not a replacement for professional legal advice but an effort to assist you in making a sound decision.

Name: J. Rand Pearson

Description of item under review for fair use: "Ribcraft 4.8," Ribcraft USA, Retrieved from <http://www.ribcraftusa.com/rib48.html>.

Report generated on: 09-24-2015 at : 15:53:09

Based on the information you provided:

Factor 1

Your consideration of the purpose and character of your use of the copyright work weighs: *in favor of fair use*

Factor 2

Your consideration of the nature of the copyrighted work you used weighs: *in favor of fair use*

Factor 3

Your consideration of the amount and substantiality of your use of the copyrighted work weighs: *in favor of fair use*

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Your consideration of the effect or potential effect on the market after your use of the copyrighted work weighs: *in favor of fair use*

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Fair use checklist for SOC-R in Fig. 2.2

Virginia Tech ETD Fair Use Analysis Results

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Name: J. Rand Pearson

Description of item under review for fair use: Powerhouse Systems, Retrieved from <http://www.powerhousesystems.net/u.s.-navy-special-warfare-command.html>.

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Your consideration of the amount and substantiality of your use of the copyrighted work weighs: *in favor of fair use*

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Your consideration of the effect or potential effect on the market after your use of the copyrighted work weighs: *in favor of fair use*

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Fair use checklist for pipe clamp in Fig. 2.4

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Name: J. Rand Pearson

Description of item under review for fair use: "Shaft Mounting Collars 2-Piece Stackable," Stafford Manufacturing Corp., Retrieved from <http://www.staffordmfg.com/Product-Categories/Shaft-Mounting-Collars-2-Piece-Stackable>.

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Your consideration of the nature of the copyrighted work you used weighs: *in favor of fair use*

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Factor 4

Your consideration of the effect or potential effect on the market after your use of the copyrighted work weighs: *in favor of fair use*

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Fair use checklist for u-bolt in Fig. 2.4

Virginia Tech ETD Fair Use Analysis Results

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Name: J. Rand Pearson

Description of item under review for fair use: "83mm / M8 U BOLT EXHAUST CLAMP WITH NUTS PIPE CLAMPS TUBE CLIPS CONNECTORS," eBay, User ID: armartradingltd, Retrieved from <http://www.ebay.co.uk/itm/83mm-M8-U-BOLT-EXHAUST-CLAMP-WITH-NUTS-PIPE-CLAMPS-TUBE-CLIPS-CONNECTORS-/321332404796>.

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Your consideration of the purpose and character of your use of the copyright work weighs: *in favor of fair use*

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Factor 3

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Factor 4

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Fair use checklist for Fig. 2.1

Virginia Tech ETD Fair Use Analysis Results

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Name: J. Rand Pearson

Description of item under review for fair use: "P450 Series 2D Imaging Sonar Data Sheet," BlueView Technologies, Retrieved from <http://pdf.nauticexpo.com/pdf/blueview-technologies/p450-series/39788-54947.html>.

Report generated on: 09-24-2015 at : 15:13:49

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Factor 2

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Factor 3

Your consideration of the amount and substantiality of your use of the copyrighted work weighs: *in favor of fair use*

Factor 4

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Based on the information you provided, your use of the copyrighted work weighs: *in favor of fair use*

Fair use checklist for suction cup in Fig. 2.3

Virginia Tech ETD Fair Use Analysis Results

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Name: J. Rand Pearson

Description of item under review for fair use: "Hand-Held Suction-Cup Lifter: Aluminum Handle, 3 Cups, 220 Pound Lift Capacity," McMaster-Carr, Retrieved from <http://www.mcmaster.com/#5608a91/=z2vc4g>.

Report generated on: 09-24-2015 at : 14:14:46

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Factor 2

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Factor 3

Your consideration of the amount and substantiality of your use of the copyrighted work weighs: *in favor of fair use*

Factor 4

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Fair use checklist for magnet in Fig. 2.3

Virginia Tech ETD Fair Use Analysis Results

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Name: J. Rand Pearson

Description of item under review for fair use: "Cylinder Magnets: DZ0X8-N52," K&J Magnetics, Inc., Retrieved from <https://www.kjmagnetics.com/proddetail.asp?prod=DZ0X8-N52>.

Report generated on: 09-24-2015 at : 14:09:30

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Factor 2

Your consideration of the nature of the copyrighted work you used weighs: *in favor of fair use*

Factor 3

Your consideration of the amount and substantiality of your use of the copyrighted work weighs: *in favor of fair use*

Factor 4

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Based on the information you provided, your use of the copyrighted work weighs: *in favor of fair use*

Fair use checklist for Fig. 2.5

Virginia Tech ETD Fair Use Analysis Results

This is not a replacement for professional legal advice but an effort to assist you in making a sound decision.

Name: J. Rand Pearson

Description of item under review for fair use: “EAS®-smartic® Installation space-optimised torque limiting clutches” [Product guide] Mayr, Retrieved from <http://www.industrialclutch.com/pdf/mayr-eas-smartic.pdf>.

Report generated on: 09-24-2015 at : 11:52:40

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Your consideration of the nature of the copyrighted work you used weighs: *in favor of fair use*

Factor 3

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Factor 4

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Based on the information you provided, your use of the copyrighted work weighs: *in favor of fair use*

Permission for Fig. 2.8

SeaFox Photos

3 messages

Rand Pearson <jpears08@vt.edu>

Tue, Jan 13, 2015 at 3:35 PM

To: "Kragelund, Sean (CIV)" <spkragel@nps.edu>

Hi Sean:

How goes it in California? Hopefully you are having a bit of rain after the summer/fall you had.

I've been working on my Master's thesis and I wanted to check with you to see if it would be ok to use a couple photos of SeaFox you sent me a few years ago. The photos are below and show the SeaFox with its sonar mount in the deployed and retracted positions. Would it be ok to use these?

Thanks,
Rand

Kragelund, Sean (CIV) <spkragel@nps.edu>

Tue, Jan 13, 2015 at 5:08 PM

To: Rand Pearson <jpears08@vt.edu>

Hi Rand,

We did get a good soaking in early December, but the drought continues! (I'm not complaining)

Please feel free to use any SeaFox photos you have, or let me know if there's something else you're looking for. I can always dig around my hard drive(s) for a different photo.

I thought of you last week when I came across this website: <http://universalsonarmount.com/>

How's the Masters coming?

Best,

Sean

Permission for Fig. 2.7, Fig. 2.9, and Fig. 3.5

Sonar Mount Renderings

3 messages

Rand Pearson <jpears08@vt.edu>

Tue, Jan 13, 2015 at 3:24 PM

To: Kevin Kline <kevinkline4124@gmail.com>

Hey Kevin:

How have you been? How's work going?

Life in Blacksburg is good. The weather is about what you would expect this time of year. I finally started writing my Master's thesis and its coming slowly but surely. I plan to defend sometime in April or May.

I'm contacting you to ask about a few renderings you did that I'd like to use in my thesis (see below). The renderings will go in the concept generation section with a brief description of each concept. Would this be ok?

Thanks,
Rand

Kevin Kline <kevinkline4124@gmail.com>

Tue, Jan 13, 2015 at 4:43 PM

To: Rand Pearson <jpears08@vt.edu>

Hey Rand,

You are more than welcome to use any of the rendering or any any other documentation I might have created during that project. Let me know when you have a date set for your defense because I would be interested in attending if it is open to the public. I am in Blacksburg frequently to visit Courtney as she finished up her undergrad this spring.

Work is going well. I am working for Canon Virginia as a mechanical engineer in their rotation program which means that I change departments every 6 months for the first year and a half of employment. I just finished my first rotation in the research and development department and am in the process of transferring to a business planing group to get some business experience within the company. Overall, I am enjoying it.

Good luck on the thesis!
-Kevin

Public domain verification for Fig. 5.9

ATLAS Photo Use Permission

5 messages

Rand Pearson <jpears08@vt.edu>

Tue, Jan 13, 2015 at 4:21 PM

To: loeffler <loeffler@arlut.utexas.edu>

Mr. Loeffler:

My name is Jackson Pearson. I'm a graduate student at Virginia Tech and I'm currently writing a thesis

Mechanical Design of a Sonar Mount for an Unmanned Surface Vehicle

detailing my work on the design of a sonar mount for an autonomous or semi-autonomous boat.

I am writing to ask permission to use a photo of the ATLAS sonar mounted on a REMUS 600 from the 2010 Thunder Bay Expedition in my thesis. The photo in question can be found at the link below.

<http://oceanexplorer.noaa.gov/explorations/10thunderbay/background/sonar/media/2sonar.html>

Would this be acceptable? Please let me know if you need any other information from me.

Thanks for your time,
Jackson

loeffler <loeffler@arlut.utexas.edu>
To: Rand Pearson <jpears08@vt.edu>

Tue, Jan 13, 2015 at 5:02PM

Good Afternoon Jackson,

That's fine. Those photos are in the public domain, but thanks for asking.

So, what is your thesis topic? Are you investigating mechanical or hydrodynamic properties or some other aspect of vehicle design?

Take Care & Good Luck on the thesis,
charlie

Charles Loeffler
Senior Engineering Scientist
The Applied Research Laboratories
The University of Texas at Austin

[\(512\) 835-3494](tel:5128353494)
loeffler@arlut.utexas.edu

Permission to Use Chapter Three Contributions from Adam Shoemaker

Adam Shoemaker is responsible for the SDOF and Distributed Parameter models, as well as any text or figures associated with them. He is also responsible for the content in the Experimentation, Symmetry, Repeatability, and Mode Shape sections. Permission to use this content in this thesis was obtained in person on May 7, 2015.