



Module 1C

Modern Navigation Systems

Textbooks and Supplementary Resources



Course materials

- Books
 - There will be two required textbooks
 - Several optional books that are relevant are listed as well
 - Amazon pages for each are included reproduced herein
- Videos
 - Excerpts of some commercial videos will be posted to Learn
 - Course-specific videos, in addition to the .MP4 files for each module, will be posted to Learn
- Web sites
 - Some useful web sites are identified



The primary textbook

- The main text for the course is Avionics Navigation Systems, 2nd Edition, by Kayton and Fried
 - Do not purchase the 1st edition, which is over 40 years old, unless you are interested in the historical perspective, including copious block diagrams of the analog systems used for the Apollo program



The additional text

- It is also important to purchase a copy of the current Nautical Almanac
 - In addition to tables of celestial parameters, it contains extensive tutorial material
- The Stars, by H.A. Rey, is also worth purchasing, although you can get by without it.



Supplemental reading

- Additional, but optional books, are
 - Longitude, by Dava Sobel
 - Drawing the Line, by Danson
 - The 1804 Nautical Almanac, by Maskelyne
 - The Lewis and Clark Journals
 - These are available free on-line
 - River Horse, by William Least-Heat Moon



Supplemental Videos

- Excerpts from commercial videos will be posted online
 - William F. Buckley's tutorial on celestial navigation
 - The supplement to the Ringling Brothers circus highlight DVD
 - This provides an excellent summary of the properties and features of angular momentum
 - The summary of the Cospas-Sarsat system



Course-specific videos

- A variety of course-specific videos will be posted to Blackboard/Learn as supplements to the relevant modules



Recreational videos

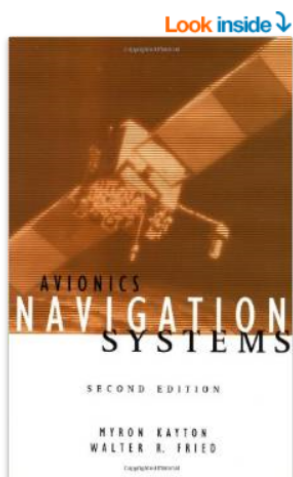
- Relevant films/movies that are worth watching for fun include:
 - All is Lost, Robert Redford
 - Longitude, Sobel (PBS)
 - Any of the various Amelia Earhart documentaries
 - Into the Wild, based on Krakauer's book



Useful websites

- As stated, the Lewis and Clark journals are online
 - They can also be downloaded to Kindle for a couple of dollars
- The US Naval Observatory has free on-line databases and celestial calculators

Avionics Navigation Systems

[See this image](#)

Avionics Navigation Systems Hardcover – April, 1997

by Myron Kayton (Author), Walter R. Fried (Author)

★★★★☆ 7 customer reviews

ISBN-13: 978-0471547952 | ISBN-10: 0471547956 | Edition: 2nd


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An indispensable resource for all those who design, build, manage, and operate electronic navigation systems Avionics Navigation Systems, Second Edition, is a complete guide to the art and science of modern electronic navigation, focusing on aircraft. It covers electronic navigation systems in civil and military aircraft, helicopters, unmanned aerial vehicles, and manned spacecraft. It has been thoroughly updated and expanded to include all of the major advances that have occurred since the publication of

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The 2015 Nautical Almanac



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2015 Nautical Almanac Paperback – August 1, 2014

by [US Naval Observatory](#) (Author), [UK Hydrographic](#) (Author)

★★★★★ ▾ 4 customer reviews

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The cornerstone for all celestial navigation, listing the celestial bodies used for navigation, a sight reduction table, and other information valuable to the offshore navigator. The content of this edition is identical to the United States Naval Observatory edition. Paradise Cay Publications is the only entity in the United States other than the US Government legally authorized to publish the full contents of the Nautical Almanac.

Purchase in paperback from Amazon or elsewhere.

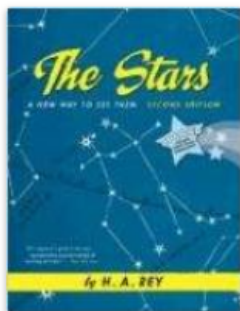
The Stars

The Stars Paperback – October 27, 2008

by [H. A. Rey](#) (Author)

★★★★★ 173 customer reviews

#1 Best Seller in Astronomy for Teens & Young Adults



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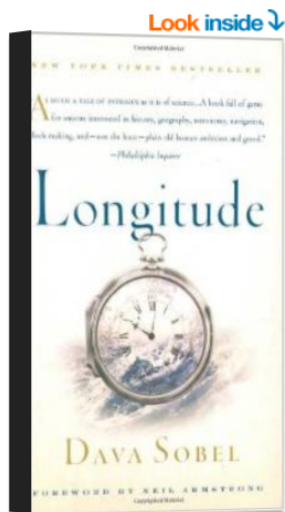
Containing star charts, a guide to the constellations, and details about seasons and the movement of the objects we see in the sky, this classic book makes H. A. Rey's passion for astronomy evident on every page.

Second edition updates concentrate on the planetary and solar system information in the latter half of the book. Facts and figures for each planet have been revised, and new scientific information has been added, including sections on earth-asteroid collisions, black holes, supernovas, the Kuiper Belt (asteroid belt beyond Neptune), Pluto's reclassification, and how the moon was formed.



3 images

Longitude, by Dava Sobel

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Longitude: The True Story of a Lone Genius Who Solved the Greatest Scientific Problem of His Time Paperback – October 30, 2007

by [Dava Sobel](#) (Author)

★★★★☆ 636 customer reviews

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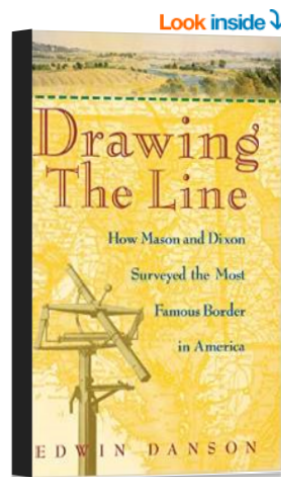
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Anyone alive in the eighteenth century would have known that "the longitude problem" was the thorniest scientific dilemma of the day--and had been for centuries. Lacking the ability to measure their longitude, sailors throughout the great ages of exploration had been literally lost at sea as soon as they lost sight of land. Thousands of lives and the increasing fortunes of nations hung on a resolution. One man, John Harrison, in complete opposition to the scientific community, dared to imagine a mechanical solution--a

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Available from Amazon

Drawing the Line, by Danson

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Drawing the Line : How Mason and Dixon Surveyed the Most Famous Border in America Hardcover – December 8, 2000

by [Edwin Danson](#) (Author)




★★★★★ 27 customer reviews

ISBN-13: 978-0471385028 | ISBN-10: 0471385026 | Edition: 1stGet the Kindle Edition for just \$2.99 when you buy the new print edition of this book. [Learn more about kindle matchbook](#)

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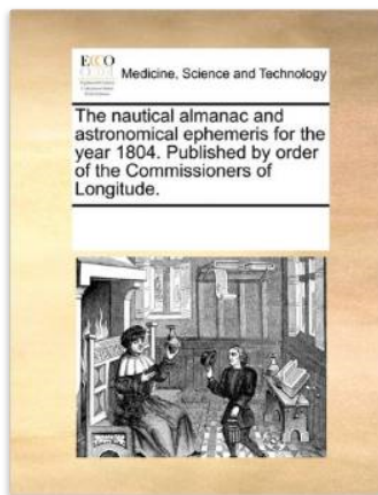
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The logo for Amazon Student, featuring the word 'amazon' in its signature font and 'student' in a smaller, sans-serif font.

THE FIRST POPULAR HISTORY OF THE MAKING OF THE MASON-DIXON LINE The Mason-Dixon line—surely the most famous surveyors' line ever drawn—represents one of the greatest and most difficult scientific achievements of its time. But behind this significant triumph is a thrilling story, one that has thus far eluded both historians and surveyors. In this engrossing narrative, professional surveyor Edwin Danson takes us on a fascinating journey with Charles Mason and Jeremiah Dixon, two gifted and

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The 1804 Nautical Almanac, by Maskelyne



[See this image](#)

The nautical almanac and astronomical ephemeris for the year 1804. Published by order of the Commissioners of Longitude. Paperback – June 1, 2010

by [See Notes Multiple Contributors](#) (Author)

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The 18th century was a wealth of knowledge, exploration and rapidly growing technology and expanding record-keeping made possible by advances in the printing press. In its determination to preserve the century of revolution, Gale initiated a revolution of its own: digitization of epic proportions to preserve these invaluable works in the largest archive of its kind. Now for the first time these high-quality digital copies of original 18th century manuscripts are available in print, making them highly accessible to

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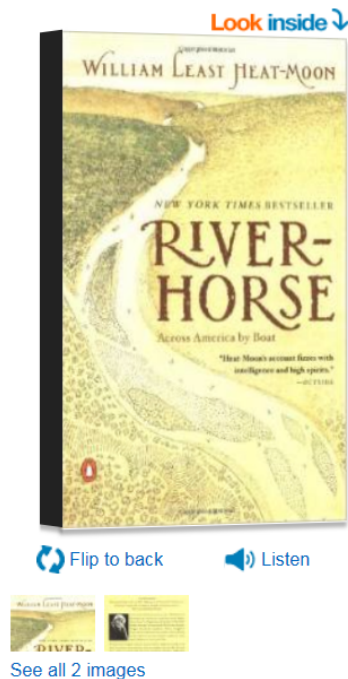
Available in paperback from Amazon

Lewis and Clark Journals



Online – University of Nebraska, or Amazon (incl. Kindle)

River Horse, by William Least-Heat Moon



River-Horse: The Logbook of a Boat Across America Paperback – April 1, 2001

by William Least Heat-Moon (Author)

★★★★☆ 120 customer reviews

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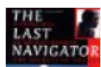
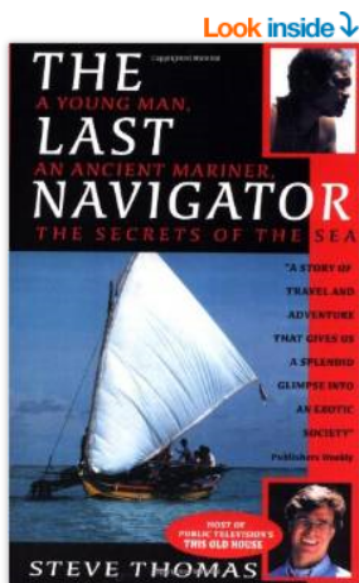
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The author of **Blue Highways** and **PrairieErth** "takes us on a lifetime voyage full of imagery, insight and appreciation." --**Cleveland Plain Dealer**

In his most ambitious journey ever, **William Least Heat-Moon** sets off aboard a small boat named Nikawa ("river horse" in Osage) from the Atlantic at New York Harbor in hopes of entering the Pacific near Astoria, Oregon. He and his companion, Pilotis, struggle to cover some 5,000 watery miles, often

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The Last Navigator, by Thomas



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The Last Navigator Paperback – October 1, 1997

by Stephen D. Thomas (Author)

★★★★☆ 17 customer reviews

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Nonfiction account of a young American man's sojourn in the South Pacific, on the Micronesian island of Satawal in the Caroline archipelago, studying traditional navigation with Mau Pailug, the last of the palus. It was Pailug who navigated a Polynesian vessel from Hawaii to Tahiti without compass or charts, as documented by a PBS film of the voyage. Thomas learns how to navigate by stars, wind, swell, birds, and memory. It is a story of seafaring, a dying culture, and self-discovery.



Summary

- There are many people, some extremely wealthy and successful, who do the most challenging computations of this course for fun
- In other cases, it is a matter of survival and desperation
- For an engineer, this work can form the basis of a successful and fulfilling career



End of Mod 1C