

Short Course Initiative

April 2019

Short Course Committee:
Stefano Coraluppi (Chair), Lorenzo
Lo Monte, Luke Rosenberg, Michael
Wicks, Jason Williams



Background¹

- AESS Short Course (ad hoc) Committee was first established in 2018
- Business model
 - 1-3 day courses to be hosted by AESS Chapters
 - Provides a lengthier presentation than DL program, allowing educational/professional development
 - Fee for participation. AESS Chapter covers speaker/venue honorarium and costs (with seed money). Surplus 20% to AESS, 80% to Chapter
- Program info is available online
 - <http://ieee-aess.org/aess-short-course>

Background²

■ Short courses to date

- Fabrizio, South Australia Section, CSS/AESS Chapters, Nov 2015 (1 day)
- Lo Monte, South Australia Section, CSS/AESS Chapters, Nov 2017 (3 days)
- Lo Monte, Germany Section, AESS Chapter, Oct 2018 (2 days)
- Lo Monte, USA Air Force LCMC, Aug 2019 (5 days)
- Crouse, South Australia Section, CSS/AESS Chapters, Jun 2019 (2 days)

■ Instructors

- Greco, Griffiths, Fabrizio, Lo Monte, Koch, Crouse

Upcoming course (Crouse)



IEEE IEEE South Australia Section
Control & Aerospace and Electronic Systems Chapter

Two Day Workshop Basic Algorithms for Target Tracking

The IEEE SA Section and C&AES Chapter invites you to attend a two day workshop by
Dr David Crouse - Radar Division, Naval Research Laboratory USA

About the workshop:

This course goes through a variety of components that arise in target tracking algorithms, with a focus on single-scan algorithms. In many areas, reference is made to functions in the open-source copy left-free Tracker Component Library (available online) so that attendees can rapidly apply the algorithms that are discussed. The presentation slides containing additional derivations will be made available. A full course outline is given on the next page.



About the presenter:

David Frederic Crouse received B.S., M.S., and Ph.D. degrees in Electrical Engineering in 2005, 2008, and 2011 from the University of Connecticut (UCONN). He also received a B.A. degree in German from UCONN for which he spent a year at the Ruprecht-Karls Universität in Heidelberg, Germany. He is the recipient of the 2016 Young Investigator Award from the International Society on Information Fusion and the recipient of a 2015 Alan Berman Research Publication award from the Naval Research Laboratory for the paper "Basic Tracking Using Nonlinear Continuous-Time Dynamic Models." He is currently employed at the Naval Research Laboratory in Washington, D.C. and serves as associate editor in chief at the IEEE Aerospace and Electronic Systems Magazine.

Date: 17-18 June 2019
Time: 9:00 am - 5:00 pm

Venue:
Ingkarni Wardli 218 Collaborative
Teaching Suite
University of Adelaide
North Terrace Adelaide

Registration through
[Eventbrite](#)

Early bird registration
closes May 3 2019



Attendance Costs (ex. GST)

	Early Bird	Regular
DST Group Employee* (course sponsor)	Free	Free
Non-IEEE Member	\$450	\$500
IEEE Member**	\$400	\$450
Student*		\$200

Contact:

Luke Rosenberg
IEEE SA Section, CAES Chair
Phone: 0421082418
Email: luke.rosenberg@ieee.org

* DST Group employees and students need to show ID when registering.
** IEEE membership discount applies to current IEEE members.



IEEE

IEEE South Australia Section, C&AES Chapter
Basic Algorithms for Target Tracking

Course Content*

- 1) Introduction
- 2) Basic Estimation
 - Mathematical Concepts
 - Mathematical Coordinate Systems
 - Signal Processing Topics
 - Measurement Conversion
 - Parameter Estimation
 - Bayesian Estimation
 - Assessing Estimator Performance
 - Nonlinear Measurement Updates
 - Track Initiation
 - Linear Dynamic Models
- 3) Nonlinear Dynamics
 - Deterministic Differential Equations
 - Stochastic Dynamic Models
 - Nonlinear Continuous-Time Propagation
 - Celestial and Terrestrial Coordinate Systems
 - Basic Orbital Dynamics
- 4) Estimation with Model Mismatches
 - Simple Robustness Techniques
 - Alternative Filters
 - Multiple Model Algorithms
- 5) Target-Measurement Association
 - Cost Functions for Measurement Assignment
 - Single-Scan Assignment Algorithms
 - Comments on Beams
 - Single Scan Track Confirmation and Termination
 - Offline Performance Prediction
 - Multiframe Assignment
- 6) Estimation with High Nonlinearity
 - Particle Filtering
 - Particle Flow Filtering
 - Track Initiation with Any Type of Measurement

* Final content may differ slightly

Current priorities

- Update/maintain website
 - Add summary of short-course logistics
 - For each course, specify nominal course title/summary/duration – not just “technical areas of interest”
- Identify instructors and advertise offerings
 - Potential: Das, Smith, Wicks
 - Advertise regularly in QEB and Systems Magazine
 - Direct, targeted approach (DLs, tutorial speakers, ...)
 - Email to be sent to all Chapter Chairs (<http://iee-aess.org/chapters/all>)

Open question

■ Flexibility on funding model

- Request from Bolivia Section Chair

Mi name is Paola Escobari and I am the IEEE Bolivia Section Chair, we don't have an AESS chapter open yet but we are organizing a big event of aerospace in October to engage students and young professionals in this area, we would like to have a short course as part of this event, but the costs and budget detailed on the example in the webpage are extremely expensive for any country in south america.

I would like to know how likely is to treat a short course as a DLT so the section will only pay the costs inside the countries (food, hotel and local transportation). Of course some other sections can be part of the DLT so the cost can be reduced.

Backup

Short Course Initiative

Chapter Summit

April 26, 2018

AESS Board of Governors Meeting

April 27-28, 2018

Oklahoma City, OK, USA



Background

- Many AESS chapters have insufficient revenue to organise events, especially with external speakers.
- The Short Course Initiative was conceived back in May 2015 by then VP Education, Joe Fabrizio.
- He ran a pilot program in November of 2015 by giving a one-day workshop himself, drawing in many participants and proved his idea as successful, raising around AUS\$10K for the local chapter.
- The South Australia Chapter ran a second “pilot” in 2017, bringing AESS Distinguished Lecturer, Lorenzo Lo Monte in to give a multi-day course, with equal success - 45 participants and AUS\$15K profit.
- Short courses offer the opportunity to fund high quality speakers, provide useful training, engage with the local community and raise revenue which can be directed towards further events.
- Courses can be offered to industry, government laboratories and academia – these organisations typically have training budgets.

Organisation

- We recognise that the details of every course will be different.
- This outline provides some general guidance to assist in the planning.
- Short course organiser – should be the local AESS chapter chair with support from other local members.
- First step is to find a topic which will provide a reasonable audience.
 - Contact colleagues to find areas they would like training.
 - Reach out to large companies / research institutes in the local area.
 - Create an online survey for local IEEE members.
 - Contact the AESS industry relations and / or education organiser for advice (www.ieee-aess.org).

Organisation

- Find a speaker and agree on the date.
 - This may be someone from the short course website or someone known in the local industry.
 - Contact the respective AESS technical panel and / or education committee for ideas.
 - Must first be approved by the AESS short course committee.
- Clarify details of the topic to be covered, duration of course and whether they would be prepared to give multiple courses in different (nearby) locations.
- Venue – Should be accessible for all attendees.
 - Requires seats / tables / projector / screen / lectern.
 - If possible, record presentation – see guide for recording presentations on the short course website.
 - Should hold between 10-50 attendees.
 - Be near public transport / suitable car parking.

Budget - planning

- Goal is to keep costs as low as possible to attract large audience.
- Instructors should be offered an honorarium (although not everyone will be able to accept it).
- AESS can provide seed money of US\$2500 to help with initial course expenses (then paid back from the course profits).
- All expenses of the instructor should be covered. They are expected to travel economy and stay at a hotel near the venue.
- Course costs should be chosen to match the expected expenses (see example spreadsheet for planning).
- Offer different pricing for IEEE members / non members and students.
- Profit should be split 80/20 with the local chapter / AESS.

Budget – risks

- There may be financial losses due to poor attendance.
- To reduce risk we suggest:
 - Set an early bird payment date (~30 days before the course) to attract early registrations.
 - If sufficient registrations are not achieved by this date, then make it clear that the course may be cancelled and fees refunded.
 - AESS short course committee can offer advice if there are any concerns.
 - Chapter chairs should book venues / flights with the ability to cancel if necessary (i.e. flight insurance).
 - Only after the course is deemed ok to proceed, should funds be committed.

Budget - planner

Expenses:	Cost ex Tax	Tax	Total cost
Airfare	2,688.64	268.86	2,957.50
Accommodation	500.00	50.00	550.00
Meals / incidentals	250.00	25.00	275.00
Speaker fee	5,000.00		5,000.00
AESS seed money payback	2,500.00		2,500.00
Credit card fees			448.70
Tax			2,389.72
Catering	3,089.08	258.92	3,348.00
Networking drinks	672.73	67.27	740.00
Course notes	1,389.76	138.98	1,528.74
Misc	17.88	1.79	19.67
			19,757.33

Income:	
AESS seed money	2500
Avg cost per day	300
Estimated number of attendees	30
Number of days	3
Expected Income	29500
Total profit	9,742.67
Chapter profit (80%)	7794.136
AESS profit (20%)	1948.534

Registration - vTools

- Course can be organised with the IEEE vTools.
 - This is a free service offered by the IEEE (<http://sites.ieee.org/vtools/>)
 - Automatically connected to the L31 reporting tools.
 - Can manage registrations and send bulk emails.
- In the USA - manages credit card payments and interfaces with the concentration bank accounts.
- Easier to manage if the local AESS chapter has their own bank account separate to the section.
- At this time, vTools Payment is still being developed for countries outside the US and Canada. An update will be provided as the payment method is formalized.

Advertising

- Create a flyer for advertising with all the required information.
 - Using vTools, send an eNotice to the local (and nearby) AESS sections.
 - Post it on the local (and nearby) IEEE section websites.
 - Using your networks, forward the flyer to local companies and universities.



IEEE IEEE South Australia Section
Control & Aerospace and Electronic Systems Chapter

One Day Workshop Introduction to Over-the-Horizon Radar (OTHR)

About the workshop:

The workshop introduces the fundamental principles of OTHR design and operation in the challenging HF environment to motivate and explain the architecture and capabilities of modern OTHR systems. It describes conventional and adaptive processing techniques for clutter and interference mitigation as well as emerging applications, including HF passive radar, blind signal separation and multipath-driven geolocation. A highlight of the workshop is the prolific inclusion of experimental results to illustrate the practical application of advanced signal processing to real-world OTHR systems. The workshop is expected to benefit students, researchers, engineers and practitioners working in the OTHR field.



Content includes:

- Fundamental principles and practical applications
- OTHR system design and nominal capabilities
- HF Propagation and radar resource management
- Array signal models and conventional processing
- Robust adaptive processing in space and time
- Includes many real-data processing examples

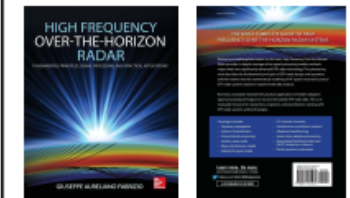
About the presenter:

Dr Giuseppe (Joe) Fabrizio has over 20 years experience in adaptive signal processing for OTH radar. Over his career, he has conducted extensive research to develop and implement robust adaptive signal processing algorithms in operational OTHR systems. He is the author of more than 50 publications in this field, including the text *"High Frequency Over-the-Horizon Radar—Fundamental Principles, Signal Processing and Practical Applications."*

Workshop details:

Time: 9:00 am - 5:00 pm
Date: Friday 27 November, 2015
Venue: Technology Park
Adelaide Conference Centre
Innovation House
50 Mawson Lakes Boulevard
Mawson Lakes SA 5095

Participants receive the comprehensive text
"High Frequency Over-the-Horizon Radar"
(Hardcover, McGraw-Hill Professional, NY, 2013)



Positions are limited so secure your place by downloading the registration form from

ewh.ieee.org/r10/s_australia/

	Early Bird	Regular
Non-IEEE Member	\$650	\$700
IEEE Member	\$550	\$600
Student	\$300	\$350
IEEE Student Member	\$250	\$300

Early bird registration closes 2 November 2015

AESS Instructors

- A list of AESS short courses and instructors will soon be compiled for the short course web site.
- If you would like to sign up as an instructor, the expectation is:
 - You provide a list of topics which are vetted by the short course committee.
 - Course topics are not to be too technical or too generic unless the audience has agreed to the content.
 - Agree to perform the course as a volunteer or with an agreed upon honorarium.
 - Be prepared to travel internationally.
- The slides are owned by the instructor, but if they agree to be recorded to have it included on the AESS Resource Center, they will sign a Copyright Form, and the slides will be posted as well.

Course example

- Luke met with Lorenzo Lo Monte at the Seattle radar conference about a potential course.
- Luke then surveyed his organisation (Defence Science and Technology Group) to identify the greatest training need.
- Lorenzo Lo Monte agreed to visit Adelaide, South Australia and give a three day course on rapid systems prototyping and electronic warfare in November 2017.
- Lorenzo provided a short description of each day and Luke advertised the it as a Distinguished lecture course.



IEEE AES Distinguished Lecture Series

The IEEE South Australia Section, IEEE Aerospace and Electronic Systems society, and Telephonics Corporation are pleased to offer three full-day tutorials. The tutorials are introductory in nature and only a basic knowledge of radar is necessary.

Tutorial 1: Radar Systems Prototyping

Tuesday, November 14th 2017

Whether you are a student seeking real data to prove your Ph.D. thesis, or a researcher planning for experimentation in your grant proposal, or a system engineer in need of a radar prototype to demonstrate your innovative idea to a customer, you will be faced with prototyping a radar system with limited time and budget. This tutorial will provide you with practical skills and techniques needed to build your advanced radar prototype. The focus is not on how devices/algorithms work, but on how to *relate* the choice of microwave devices and signal processing algorithms to the desired radar specifications. The course will end with a step-by-step MIMO radar design example, starting from the requirements and ending with a schematic.

Tutorial 2: Introduction to Electronic Warfare

Wednesday, November 15th 2017

Learn the technologies and algorithms behind the electronic warfare systems protecting assets, territories and human lives. Electronic warfare (EW) can be essentially divided in three categories: electronic attack (EA), electronic support (ES) and electronic protection (EP). EW is a large field spanning different domains, such as radar, communications, EO/IR, and cyber. This tutorial will focus only to EA and EP techniques applicable to radar systems, with a quick overview of IADS, surface-to-air missiles and fire control systems. Topics in EA include jamming techniques, jamming equations, anti-radiation missiles, DRFM, and SAR/ISAR jamming. Topics in EP are divided according to the radar subsystem engaged in the protection, such as transmitter, antennas, receiver, and signal processing, including techniques countering pull-offs and deceptions. The course is taught at an unclassified level.

Tutorial 3: Electronic Support, ELINT and Radar Reverse Engineering

Thursday, November 16th 2017

This tutorial continues the EW discussion by exploring its intelligence aspect, with a focus on radar systems. The course begins with the CONOPS, theories and techniques used in electronic support missions, with an emphasis on radar warning receivers. This includes an overview of signal detection and estimation, signal identification and direction finding. Next, the course explores concepts and techniques used in electronic intelligence, in particular signal processing and the time/frequency analysis. The final part of the tutorial will focus on determining RF/hardware properties using remotely collected data, such as signals and images. Using both signal and hardware clues, the intelligence analyst will be able to identify the capabilities and performance of a radar. The course is taught at an unclassified level.

Course example

- Lorenzo could not accept payment, and his company offered to pay for accommodation.
- SA chapter paid for flights with insurance in case of cancellation.
- Fees were set low and an early bird deadline was set well in advance of the course.
- Manually organised registration and credit card payments – not ideal.
- 19 registrations by the early bird date – decided to go ahead with course.
- Organised printing of course notes, catering, venue at local university and drinks function on the second night.
- Final number of registrations were 45 and profit exceeded AUS\$15K.

5/10/2022



IEEE

IEEE South Australia Section
Control & Aerospace and Electronic Systems Chapter

**Workshop on
Radar System Prototyping and Electronic Warfare**

The IEEE South Australia Section and CAES Chapter invites you to attend three one day workshops by **IEEE Distinguished Lecturer Dr Lorenzo Lo Monte - Telephonics Corporation.**

About the workshop:
This three day tutorial workshop comprises a day on radar Systems Prototyping, and two days of Electronic Warfare. This includes an introduction day covering the electronic attack (EA), electronic support (ES) and electronic protection (EP) and a second day focusing further on electronics support, ELINT and radar reverse engineering. Participants can register for any combination of days as desired. Please see second page for a full description. Note that the course is taught at an unclassified level.

About the presenter:
Dr. Lo Monte has long and comprehensive experience in applied Radar, RF, DSP, EW system design and prototyping, from small companies, consulting, academia, research institutions, to large defense contractors and government agencies worldwide. He serves as Chief Scientist at Telephonics, a Top-100 defense corporation specializing in ISR solutions, with the role of translating research innovations into commercial products. Prior to that, he was an Associate Professor at the University of Dayton, where he created the courses "Intro to Radar," "Radar/RF Systems Design," and "Intro to Electronic Warfare." He was also the Director of the Mumma Radar Laboratory. Dr. Lo Monte has published over 60 peer-reviewed journal and conference papers and two book chapters.



Dates: 14th November – Radar Systems Prototyping
15th November – Introduction to Electronic Warfare
16th November – Electronic Support, ELINT and Radar Reverse Engineering

Time: 9:00 am - 5:00 pm

Venue: University of Adelaide
Ingcarni Wardli Building, B17

Early bird registration closes 5pm 1 October 2017 *

ABN: 96 817 212 761

Three day workshop on Radar System Prototyping and EW

Cost per day (including GST)	Early Bird	Regular
<input type="checkbox"/> Non-IEEE Member	\$200	\$250
<input type="checkbox"/> IEEE Member* or Adelaide Uni. staff	\$180	\$230
<input type="checkbox"/> Student	\$100	\$150
<input type="checkbox"/> IEEE Student Member*	\$80	\$130
Total cost for chosen days: _____		

Contact:
Dr Luke Rosenberg
Chair C&AES IEEE SA
Phone: (08) 7389 5188
Email: luke.rosenberg@dst.defence.gov.au

DST Group Edinburgh
180L, PO Box 1500
Edinburgh SA 5111

Name _____

Phone/Email _____

Attendance

Day 1: Radar Systems Prototyping

Day 2: Introduction to EW

Day 3: ES, ELINT and Reverse Engineering

Special requirements _____

Method of payment Visa MasterCard

Credit Card # _____ / _____

Signature _____ Dated _____ / _____ / 2017

IEEE Member # _____

Cheque Direct Deposit

Total:** _____

Commonwealth Bank
Salisbury
BSB 065-122
ACC # 1020 9805

Confirmation of your registration will be e-mailed to you within 10 working days.
Please note that this workshop may be cancelled if an insufficient number of registrations is received by 10 November 2017. No refund is available after 10 November 2017.
* IEEE membership discount applies to current IEEE members.
** Note a 1.69% credit card fee will be added to this total.

Ideas for AESS events

- Outreach and networking events:
 - Bring a work colleague along to a sponsored event with a local member highlights the benefits of joining the AESS.
 - Industry networking event for students and young professionals.
- Sponsorship of student events
 - Conference travel for accepted papers
 - Student paper awards at conferences
 - Student competitions

Summary of Resources

- Website www.ieee-aess.org
- Contact email address: admin@ieee-aess.org
- AESS short course committee:
 - Luke Rosenberg
 - Lorenzo Lo Monte
 - Judy Scharmann
 - Jason Williams
 - Joe Fabrizio
- Resources on the website:
 - List of approved instructors
 - Example budget and spreadsheet for course management
 - Short course recording guide
 - vTools tutorial
 - Example advertising flyer (.pub and .pdf)