



## **Nordic HF Conference**

15 – 17 August 2016  
Fårö Kursgård, Fårö

### **Programme**



THE NATIONAL COMMITTEE  
FOR RADIO SCIENCE  
THE ROYAL SWEDISH ACADEMY OF SCIENCES



## **HF, LF and VLF systems – always fields of increasing importance**

The first Nordic Shortwave Symposium HF 86 was sponsored by FMV, the Swedish Defence Materiel Administration, and initiated by Carl-Henrik Walde, chief engineer and manager of its Radio Division. The event was later taken over by NRS, the Nordic Radio Society, a foundation co-operating with SNRV, the Swedish National Committee of URSI (Union Radio-Scientifique Internationale). NRS promotes exchange of knowledge between different technical disciplines and between universities and the radio industry, its board representing SNRV, the radio industry, defence organisations, telecom operators and universities.

As before, these URSI-sponsored HF conferences with the attached longwave symposia will focus on HF, LF and VLF communication, location and navigation systems "beyond the horizon". HF communications have advanced significantly towards a high degree of automation and signal processing that can be cost-effectively implemented even in small systems. High capacity multimedia networks carry not only analogue voice and data messages in a store-and-forward manner, but also digitised high quality voice, streaming data and even streaming video. Integration of VLF, LF and HF as well as VHF and UHF within these networks needs developments in modulation and coding as well as link and network management.

Automatic networking and information transparency play an increasing role for subscriber connectivity, area coverage and reliable communications, longwave and shortwave systems being only one of several available alternatives. Defence forces are the major professional users and defence applications are the technology driver. HF, LF and VLF often are the primary and sometimes the only way of providing communications.

We have two keynote speakers, viz. Professor Emeritus Eric E. Johnson of New Mexico State University and Diplom-Ingenieur Harald Wickenhäuser, retired from Rohde & Schwarz. We also have included a panel on an important long-term issue: "What areas of research, standardisation and regulation are of the greatest interest to participants at HF16? What topics need to be pursued by industry, government, regulators and standardisation bodies and in what priority?". Samuel Ritchie of ComReg, Ireland, a wellknown expert in ITU regulatory matters, has suggested this panel discussion and kindly accepted to act as moderator.

Conferences are important venues where users, scientists, engineers and manufacturers meet and have the opportunity to discuss both needs and solutions. Since the first conference in 1986, each Nordic HF conference has gathered over 100 participants, who have enjoyed the relaxed atmosphere and stimulating company of colleagues in the informal setting provided by the unique nature of Fårö and the camp. Plenty of time has been set aside outside the conference theatre to enable you to keep in touch in informal discussions and mutual exchanges of views. Please, make good use of these opportunities – the exhibition area is suitable. We hope you will get good value in spite of the somewhat primitive lodging. Companions are welcome to all activities after 1500 hours.

I extend thanks to the Fårö Camp and to the HF 16 team. I also take the opportunity of thanking our past chairman Carl-Henrik Walde, who has decided to step down after 10 successful and much appreciated conferences; he assists as event manager. The chairmanship has been transferred into very capable hands; Olov Carlsson has been in the organisation since the start as has Gunnar Eklund, our ambassador to Gotland.

Thanks are also due to the Fårö camp, ÅF Technology AB, WRAP International AB and Combitech as well as our exhibitors and sponsors including the auditorium technicians and musicians and, of course, all HF 16 participants who are welcome to join us next time at HF 19, 12-14 August, 2019 (week 33).

As chairman of NRS, I wish you very welcome to the 11th Nordic HF conference on Fårö.

Mats Nilson



## **RECEPTION DESK**

The HF 16 reception is open 15:00 – 22:00 on Sunday and 07:30 – 17:00 on Monday to Wednesday.

## **MEALS**

All meals are served in the restaurant building.

Morning and afternoon coffee/tea are served in the exhibition area (for family members in the pub).

For excursions, family members may make a lunch package at breakfast.

Breakfast 07:00 – 09:30

Coffee/tea 09:45 – 10:15

Lunch 11:30 – 13:00

Coffee/tea 15:00 – 15:30

Dinner 17:00 – 18:30                      On Tuesday the conference dinner will begin at 19:00. “Dricka” (Gotland drinks) will be served from 18:00.

Food preferences have been sent to the restaurant manager. Vegetarian food will be available; pork and chicken will not be served (the Bavarian buffet will have beef and lamb sausages). As a safety measure, you may approach the reception or a hostess to check that issue.

## **INTERNET ACCESS**

E-mail and browsing facilities are available in the anterooms of the conference theatre and in the exhibition area. For your laptops, 25 hi-speed radio access wireless networks and some ethernet outlets are available (password: Lansa).

## **DOCUMENTATION**

Proceedings of HF 16/LW 16 and earlier conferences are available on electronic media and also provided as a paperback volume. There will be “print on demand” facilities at the venue. Our website will list titles and authors of all papers for Internet search and access to the topics.

## **AMATEUR RADIO STATION**

SL1HF is situated behind Lambgiftet lodge. Station managers are conference technicians Tor Bergström (SMØCVI) and Rikard Wärf (SM1CQA). Please write the SL1HF QSL card for every QSO.

## **EXTENDED STAY AND FAMILY ACCOMMODATION**

The camp office is ready to receive your payment for extra accommodation; please pay not later than Monday afternoon.

## **TIMINGS**

General timings including social activities are on the next page with the conference programme on subsequent pages.

## **SUNDAY**

17:00 – 22:00 Bavarian buffet, sponsored by Rohde & Schwarz.

19:00 – 24:00 The pub is open.

## **MONDAY**

07:30 Morning music (Täby Spa Octet)

07:45 Please gather on the parade grounds

Opening speech by Gotland Battle Group Commander, Lt-Col Hans Håkansson.

15:30 – 17:00 Sightseeing tour on Fårö; buses leave from the garage yard.

19:00 HF 16 concert in Fårö Church

20:00 Exhibitors' party in the exhibitions grounds

19:00 – 24:00 The pub is open.

## **TUESDAY**

11:30 – 11:45 SAQ, the Alexanderson alternator at Grimeton, UNESCO world heritage: introduction and listening to a transmission from SAQ, other duties permitting, in the conference theatre.

15:30 – 18:00 “Foxhunt” (Amateur Radio Direction Finding); please assemble in the auditorium.

18:00 “Dricka” (Gotland drinks) served just outside the restaurant and pub area.

19:00 Conference dinner.

19:00 – 24:00 The pub is open.

N.B. Swedish alcohol rules state that the “Dricka” must not enter the restaurant and pub area including the terraces. On the other hand, wines etc must not exit that area.

## **WEDNESDAY**

13:45 Bus shuttle leaves for Visby airport (ETA 1500) and ferry terminal (ETA 1530).

## **EXHIBITORS** (at printing deadline)

Amtele/Rockwell

Comrod A/S

FRO, the Voluntary Radio Organisation

Rohde & Schwarz GmbH

SAQ, Grimeton radio station

SSA, the Swedish League of Radio Amateurs

Teleanalys AB

WRAP International

## **SPONSORS** (at printing deadline)

The HF 16 organisers are very grateful for the valuable sponsorships provided by the following organisations:



[www.leonardocompany.com/](http://www.leonardocompany.com/)

Banquet



[www.rohde-schwarz.com](http://www.rohde-schwarz.com)

Welcome dinner



[www.afconsult.com](http://www.afconsult.com)

Conference bag, gift to participants



[www.combitech.se](http://www.combitech.se)

Umbrellas, Proceedings CD



[www.boeing.com.au](http://www.boeing.com.au)

Best paper award



[www.wrap.se](http://www.wrap.se)

Conference pens



[www.comrod.com](http://www.comrod.com)

Banquet drinks



[www.harris.com](http://www.harris.com)

Church concert

**SESSION PROGRAMME AND CONTENTS**  
**Monday morning, 15 August**

**PROPAGATION & CHANNEL CHARACTERISTICS** **Page**  
**(Kia Wiklundh) Monday 15 August, 08:00 – 09:45**

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William N. Furman, John W. Nieto	Understanding HF channel characteristics via spectrogram interpretation and modelling	1.1
Harri Saarnisaari, Veikko Hovinen, Hannu Tuomivaara, Juha Yli-Kaakinen	Short range HF radio channel measurements: Multipath channel models	1.2
Steve Kille	Optimizing applications and data links for HF radio intermediate term variations: Can you ride the wave?	1.3

**WIDEBAND CONCEPTS** **Page**  
**(Stephan Bayer) Monday 15 August, 10:15 – 11:30**

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Eric Koski, Charles Linn, Jeffery Weston	Concepts and prospects for IP over wideband HF	2.1
Vivianne Jodalén, Terje Mikal Mjelde, William M. Batts, Jr.	Wideband HF in the arctic	2.2
William M. Batts, Jr., Vivianne Jodalén, Terje Mikal Mjelde	Performance of a transatlantic long-haul wideband HF system	2.3

**SESSION PROGRAMME AND CONTENTS**  
**Monday afternoon, 15 August**

**AERONAUTICAL SERVICES** **Page**  
**(Rickard Berg) Monday 15 August, 13:00 – 14:00**

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Karl-Arne Markström, Carl-Johan Mjöberg	Design considerations in a switching, remote control and transmission infrastructure for aeronautical HF communications	3.1
E.M. Warrington, N.C. Rogers, A.J. Stocker, J. Hallam, D.R. Siddle, H.A.H. Al-Behadili, N.Y. Zaalov, F. Honary, D.H. Boteler, D.W. Danskin	Progress towards a propagation prediction service for HF communications with aircraft on trans-polar routes	3.2

**SYSTEMS INTEGRATION** **Page**  
**(Karl-Arne Markström) Monday 15 August, 14:00 – 15:00**

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Tore Lindgren	Evaluation of HF antenna integration using the partial element equivalent circuit method	4.1
Torbjörn Carlsson	Experiences from deployment of HF systems in civilian CSDP missions in Democratic Republic of Congo and the Republic of Niger	4.2

## SESSION PROGRAMME AND CONTENTS

**Tuesday morning, 16 August**

### **ANTENNA SYSTEMS** **Page**

**(Vivianne Jodalen) Tuesday 16 August, 08:00 – 09:45**

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Harald Wickenhäuser	Active HF antennas – Truths and myths A system design engineer’s view	5.1
Håkan Bergzén	Small HF loop antenna measurements	5.2
Tomas Gustafsson, Eskil Bendz, Karl-Arne Markström, Daniel Brogren	Proof of concept for an autonomous low cost UAV- based measurement system for full-scale evaluation of MF/HF and VHF antenna systems	5.3

### **SPECTRUM MANAGEMENT** **Page**

**(Olov Carlsson) Tuesday 16 August, 10:15 – 11:30**

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Samuel Ritchie	HF broadcasting – Spectrum utilisation and trends	6.1
Sebastian Rauh, Hendrik Lieske, Robert Koch, Ewald Hedrich, Joerg Robert, Albert Heuberger	Occupancy measurements of the short-wave spectrum around 7.1 MHz over one week	6.2
Catherine Lamy-Bergot, Arnaud Kermorgant, Frédéric Gourgue, Jean-Yves Bernier, Hélène Diakhaté, Jean-Luc Rogier	Wideband HF transmissions: Operating in a crowded spectrum	6.3

### **ADDITIONAL PRESENTATION**

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Tuesday 16 August, 11:30-11:45	Special live transmission from SAQ, 17.2 kHz Alexanderson transmitter in Grimeton, for the HF 16 conference
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# SESSION PROGRAMME AND CONTENTS

## Tuesday afternoon, 16 August

### VLF/LF SYSTEMS & TECHNIQUES Page

**(Colin Breckons) Tuesday 16 August, 13:00 – 14:00**

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Kia Wiklundh, Karina Fors	Improved receiver performance for VLF/LF communication in atmospheric noise	7.1
Arwid Komulainen, Arne Lindblad	Study on spectrum usage in the VLF band (16-30 kHz)	7.2

### TECHNICAL CHALLENGES Page

**(Harald Wickenhäuser) Tuesday 16 August, 14:00 – 15:00**

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Arnie Johansen	A direction finding capability for a high frequency system	8.1
Rickard Berg	Future challenges in military communications	8.2

### ADDITIONAL EVENT

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Tuesday 16 August, 15:30-18:00	HF 16 Foxhunt (ARDF, Amater Radio Direction Finding) Please assemble in the auditorium.
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# SESSION PROGRAMME AND CONTENTS

Wednesday morning, 17 August

## ADAPTIVE ARCHITECTURES Page

(Nigel Arthur) Wednesday 17 August, 08:00 – 09:45

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Eric E. Johnson	Wideband ALE – The next generation of HF	9.1
Antti Immonen	Improving the Finnish army HF communications system – Effectiveness by means of spectrum sensing cognitive radio	9.2
William N. Furman, John W. Nieto, William M. Batts, Jr.	On air operation of the Harris adaptive wideband cognitive ALE	9.3

## PANEL DISCUSSION

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Wednesday 17 August, 10:30-11:30	“What areas of research, standardisation and regulation are of the greatest interest to participants at HF16? What topics need to be pursued by industry, government, regulators and standardisation bodies and in what priority?” Moderator: Samuel Ritchie
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## ADDITIONAL PRESENTATION

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Wednesday 17 August, 11:30-11:45	Presentation of the Leonardo company
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In 2019, we will meet at HF 19 on Fårö on August 12-14.

## ORGANISING TEAM

Olov Carlsson	WRAP International AB (chairman, exhibition, sponsorships)
Carl-Henrik Walde	SNRV and NRS (past chairman, event manager)
Karl-Arne Markström	ÅF Technology AB (programme committee chairman)
Gunnar Eklund	(ambassador to Gotland)
Marie Lindersjö	(chief stewardess)
Mats Nilson	SNRV (NRS chairman)

## PROGRAMME COMMITTEE

Karl-Arne Markström	ÅF Technology AB (chairman)
Håkan Bergzén	Combitech AB (secretary)
Dag Stranneby	University of Örebro
Rolf Gustavsson	Swedish Defence Research Agency
Rickard Berg	Swedish Defence Materiel Administration
Kjell Brethack	Swedish Defence Materiel Administration

## CONFERENCE HOSTESSES

Marie Lindersjö  
Eva Carlsson

## CONFERENCE TECHNICIANS

Christina Wärff	
Rikard Wärff	SM1CQA
Tor Bergström	SMØCVI
Jan Englund	

## CAMP HOSTS

Jan-Erik Engström	Camp chairman and pub manager
Lars Weinebrandt	Camp manager
Anna-Greta Grund	Restaurant manager

## CONTACTS AT HF 16

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