



## Location

CCG-Center, Technologiepark  
Argelsrieder Feld 22, bldg. TE 03, D-82234 Wessling-Oberpfaffenhofen  
A list of nearby accommodations, a description of the location and hints for travel will be mailed to the participants upon registration. Please make your own hotel accommodation.

## Fee

EUR 1.375,-  
CCG is a non-profit organisation, exempt from value-added tax in Germany. For foreign seminar locations the local tax regulations are applicable.  
Members of CCG receive a discount of 10 %. Where several employees from one company / office apply for the same course, each participant will receive a discount of 10 %. For students special rates are available on request. Discounts cannot be combined.  
Please pay by non-cash means after receiving the invoice.

## Registration

Please write or call (up to 3 weeks before the seminar) to Carl-Cranz-Gesellschaft e.V.; Argelsrieder Feld 22, D-82234 Wessling  
Tel. +49 (0) 8153 / 88 11 98 -12, Fax -19, E-Mail: anmelden@ccg-ev.de  
**Internet:** www.ccg-ev.de  
After receipt of registration, a confirmation letter will be sent.

## Further Information

For more information about our organization please do not hesitate to contact the CCG at Oberpfaffenhofen at the phone number given above.  
For more information on the content of the seminar please contact

Dr.-Ing. Francesco Rossetto  
Rohde & Schwarz GmbH & Co. KG, D-81614 München  
E-Mail: francesco.rossetto@rohde-schwarz.com

## Substitutions and Cancellations

Substitutions may be made at any time. Cancellation of an accepted registration made up to 10 days prior to the start of the seminar is subject to a EUR 25,- administrative fee. Participants canceling after that date are responsible for the entire seminar fee.  
CCG reserves the right to cancel a course up to 10 days before the course's beginning in case of low number of participants or for other significant reasons. Furthermore, CCG reserves the right, against the announcement in the programme, to possibly replace at short notice a lecturer and also the lecturer's topic. Any claims for damages shall be excluded.

## Who Should Attend

Engineers and project technical leaders and decision makers from both industry and research institutions in the areas of wireless communications, sensors, military and car communications

## Focus

The seminar focuses on the applications and missions of multihop wireless networks and discusses a few selected fundamental theoretical results on the capacity. It provides a comprehensive discussion of the different protocol layers, from PHY to transport. For each layer, the best established research results are compared against the different real world implementations and the important engineering challenges are analysed.  
The layer-oriented discussion is completed by topics like directive antennas in MANETs as well as broadcast protocols. Finally, the most successful application scenarios are discussed in detail, with emphasis on military, vehicular and directional networks.

The material will provide both a thorough overview of the general aspects, issues and solutions for MANETs as well as in-depth discussion of the practical implementations.

## Lecturers

Francesco Rossetto	Dr.-Ing.	Rohde & Schwarz GmbH & Co. KG, München
Andrea Munari	Dr.-Ing.	DLR, German Aerospace Center Oberpfaffenhofen

## Seminar DK 1.22

# Ad Hoc Networks: Peer to Peer for wireless networking

**October 17 – 18, 2023**  
**Oberpfaffenhofen near Munich**

## Scientific Coordination

Dr.-Ing. Francesco Rossetto  
Rohde & Schwarz GmbH & Co. KG,  
München



## Seminar Outline

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**Tuesday, October 17, 2023**  
**10.15 – 16.30**

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10.15 – 10.30	Introduction
10.30 – 12.00 F. Rossetto	<b>General aspects and PHY layer</b> MANET motivations and applications – Capacity of ad hoc networks – PHY layer in ad hoc networks – Channel impairments and interference – Most wide-spread PHY techniques
13.00 – 14.30 A. Munari	<b>Medium Access Control for MANETs</b> Scheduled and random access MACs – Coded slotted ALOHA – Fairness and possible solutions
15.00 – 16.30 A. Munari	<b>Routing I</b> Fundamentals: Dijkstra's and Bellman Ford; the challenges – Key routing protocols: DSR & AODV

**Wednesday, October 18, 2023**  
**08.30 – 16.30**

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08.30 – 10.00 A. Munari	<b>Routing II</b> Further important routing protocols: link state, geographic routing, hybrid routing – Routing metrics (power based, ETX, ETT)
10.30 – 12.00 A. Munari	<b>Broadcast &amp; Directionality</b> Broadcast: issues and approaches – Directionality in MANETs: impact on protocols, benefits & challenges, the 802.11ad
13.00 – 14.30 F. Rossetto	<b>Higher layers. Mesh &amp; tactical networks</b> TCP in MANETs – Modularity MAC/routing – Mesh networks – Tactical Networks
15.00 – 16.30 F. Rossetto	<b>Vehicular networks &amp; D2D</b> General issues for VANETs – the 802.11p and LTE V2X – LTE D2D

## Material

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Each attendant will be provided with detailed course material in English.

## Language

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English

## Additional Courses

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- „Communication Technologies for Effective Public Safety and Emergency Services“, 27.–28.9.2023 (Code DK 2.40)
- „5G Next Generation Mobile Communication“, 10.–11.10.2023 (Code DK 2.37)
- „6G, Joint Communication and Sensing“, 18.10.2023 (Code DK 2.39)