



ABCDE



Scientific Report

First name / Family name

Pierluigi / Salvo Rossi

Nationality

Italian

Name of the *Host Organisation*

NTNU

First Name / family name
of the *Scientific Coordinator*

Torbjörn / Ekman

Period of the fellowship

06/03/2013 to 05/03/2014



I – SCIENTIFIC ACTIVITY DURING YOUR FELLOWSHIP

The research activities have been related to two areas:

- wireless sensor networks in radio and underwater-acoustic channels;
- multiple access over satellite link.

In the first case, the activity has focused on the design and analysis data fusion techniques for sensor networks with event-detection tasks. Special emphasis has been given to low-complexity solutions. Numerical simulations based stochastic models for underwater environments have been performed. The impact on system performance of different parameters, such as number and quality of the sensors as well as the characteristics of the data fusion center, has been evaluated.

Also, theoretical analysis with flexible stochastic models capable to account for real-world channels has been investigated. Finally, techniques from the massive-MIMO technology have been adapted to the scenario.

In the second case, the activity has focused on the performance analysis, in terms of information capacity, of mobile terminals with random multiple access on satellite channels. The impact on system performance of different reception techniques at satellite location, focusing on multi-user interference cancellation and iterative techniques.

Both activities have been performed within the CAMOS project.

II – PUBLICATION(S) DURING YOUR FELLOWSHIP

Published:

- Ciuonzo and Salvo Rossi, "Decision Fusion with Unknown Sensor Detection Probability," *IEEE Signal Processing Letters*, vol. 21, no. 2, pp. 208-212, February 2014.

Under Review:

- Salvo Rossi, Ciuonzo, Ekman, and Dong, "Energy Detection for MIMO Decision Fusion in Underwater Sensor Networks," *IEEE Journal of Sensors*.
- Papa, Ciuonzo, Romano, and Salvo Rossi, "A Dominance-Based Soft-Input Soft-Output MIMO Detector with Near-Optimal Performance," *IEEE Transactions on Communications*.
- Salvo Rossi, Ciuonzo, Ekman, and Kansanen, "Energy Detection for Decision Fusion in Wireless Sensor Networks over Ricean-Mixture Fading," *IEEE Sensor Array and Multichannel Signal Processing Workshop 2014*.
- Ciuonzo, Salvo Rossi, and Dey, "Massive MIMO meets Decision Fusion: Decode-and-Fuse vs. Decode-then-Fuse," *IEEE Sensor Array and Multichannel Signal Processing Workshop 2014*.

In Preparation:

- Salvo Rossi, Ciuonzo, Ekman, and Kansanen, "MIMO Decision Fusion in Wireless Sensor Networks over Ricean-Mixture Fading," *IEEE Transactions on Signal Processing*.



III – ATTENDED SEMINARS, WORKHOPS, CONFERENCES

As a listener:

- Various seminars at the Department of Electronics and Telecommunications, NTNU, Trondheim, Norway.

As a speaker:

- One seminar at the Department of Electronics and Telecommunications, NTNU, Trondheim, Norway.
- One seminar at the Excellence Center for Wireless Sensor Networks (WISENET), Uppsala, Sweden.

IV – RESEARCH EXCHANGE PROGRAMME (REP)

One week visit (December 2013) to the Excellence Center for Wireless Sensor Networks (WISENET), Uppsala, Sweden.