

Recent Advances in Communication System Management, Security and Performance

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SINCE its first issue just over a decade ago Infocommunications Journal authors, readers, and especially the Editorial Board have wished to witness the journal ranking improve. Due to the sometimes exhaustive review process, the quality of the papers is high – but still, the wide acceptance of our journal got delayed. This has recently changed, and the Infocommunications Journal got ranked into the Q3 quartile in both of its domains, namely in Computer Science and in Electrical and Electronic Engineering – and it is getting closer to receiving an impact factor > 1 . Climbing up one quartile and receiving an impact factor is a great recognition; our authors' work keeps getting more visible and cited widely. Let us all keep up the excellent work and – on behalf of the Editorial Board – let me thank you, dear authors and reviewers, that our journal has passed this milestone.

The current issue of the journal features six papers; all are openly accessible already. The current issue features recent advances in the domain of quantum random number generators, satellite quantum repeaters, stateless NAT64 testing, noise suppression in power line communication, risk management for cyber-physical system of systems, as well as 5G performance evaluation. This set of papers highlight some of the advances in communication system management, security, and performance. Let us have a brief overview of the papers in this issue.

In his paper, Gábor Lencse provides an evaluation – especially for accuracy – of Siitperf, the first free software for testing the Stateless IP/ICMP Transition (SIIT) part of the RFC 8219, which is discussing benchmarking methodologies of IPv6 transition technologies. Siitperf implements throughput, frame loss rate, latency, and packet delay variation tests. The evaluation finds that the reliability of its results mainly depends on the accuracy of the timing of the Siitperf tool. The importance of such evaluation and calibration reports lies within their proof as they strengthen trust towards the methods and tools. Validation and verification equipment always have to prove themselves – that the results they provide are accurate –, and this article offers exactly those proofs.

In their recent work, Botond L. Márton, Dóra Istenes and László Bacsárdi investigate the quality of quantum based random number generators (QRNGs). After presenting the general concept of QRNGs, and two of their methods for random number generation, they introduce selected tests for determining the quality of the generated random numbers. Further, they present the idea of extractors, their place in the lifecycle of QRNGs, and eight examples of the extractors. They examined the effect of different extractors on two QRNG outputs and found that by choosing the right extractor for the task, the quality of the generated random numbers can be improved.

Satellite-based quantum repeaters are key for long-range QKD (quantum key distribution), as well as in point-to-point communication. András Mihály and László Bacsárdi evaluated the QKD capabilities of quantum repeaters in a satellite-based network, along with selected types of noises. They examined the effects of various noises on the quantum memory of quantum repeaters and their impacts on the quantum bit error rate. They found that for future satellite networks, one of the most crucial noises is the quantum dephasing noise, and in the future, we should prioritize minimizing it.

Wei Zhang et al. present an enhanced, multi-step method for impulsive noise suppression for Power Line Communication (PLC). Their method is based on wavelet dimensioning (WD) and independent component analysis (ICA). The denoising effect of the new WD-PowerICA algorithm overperforms other, compared ICA algorithms in separating noise from the useful signal, although the current paper merely analyzed the correlation index, so BER will follow as future work.

Cyber-Physical Systems of Systems (CPSoS) are complex, so as the risk factors associated with them. George Matta et al. apply threat modeling for the security analysis of CPSoS in their paper, covering risk management and threat identification, as well. After describing their integrated risk management process, they report their experience of using a risk management framework to identify the most critical security vulnerabilities in CPSoS in the railway sector and show the broader impact on the domain of safety and security management.

In his paper, John Baghous evaluates the performance of a current 5G system regarding its throughput in non-line of sight scenarios, utilizing Massive-MIMO, applying a cluster delay channel model. As expected, it is found that the throughput has improved with the use of Massive MIMO technology – the detailed results of the preliminary experience with various antenna scenarios are exciting, indeed.



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Besides being a member of HTE, he is a senior member of IEEE, where he is active both in the IEEE ComSoc (Communication Society) and IEEE IES (Industrial Electronics Society) communities. He is Editorial Board member of the Sensors (MDPI) and Electronics (MDPI) journals, and the Editor-in-Chief of the Infocommunications Journal.