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Hexa-X-II: Challenges and Future Perspectives

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Abstract: Research towards the 6th generation (6G) of mobile communications is ongoing world-wide. The Smart Network and Services Joint Undertaking (SNS JU) 6G Flagship project Hexa-X-II leads the way to the end-to-end (E2E) system design, based on integrated and interacting technology enablers. The project continues on the tracks of the Horizon Europe project Hexa-X, which has laid the foundation for the global communication network of the 2030s by developing the 6G vision and basic concepts, including candidate key technology enablers.

The work in Hexa-X-II expands from research to systemization analysis, early validation, and proof of concept. It progresses from the 6G key enablers that connect the human, physical, and digital worlds to advanced technology readiness – validated technology – including key aspects of modules, protocols and interfaces, and data. Hexa-X-II will design a system blueprint aiming at the sustainable, inclusive, and trustworthy 6G platform that should meet the future needs of serving and transforming society and business. Hexa-X-II will also address implementation aspects of the 6G platform and encompass a full scope consisting of Defining use cases, services, and requirements, ensuring the value for society; Designing the platform and system, ensuring global impact on 6G development; and Assuring technology readiness in critical areas, ensuring EU strategic autonomy.

In this talk I will give an overview on Hexa-X-II, and show some of our ongoing research at Chalmers towards 6G, with a special focus on distributed large MIMO (D-MIMO) and reconfigurable intelligent surfaces (RIS), with reflections on sustainability. D-MIMO and RISs are promising techniques to meet the envisioned required capabilities in 6G on communications, localization and sensing due to their potential of densification that will enable both more efficient, reliable, high capacity and low latency communications, as well as more accurate localization and sensing.

Bio: Tommy Svensson [S'98, M'03, SM'10] is Full Professor in Communication Systems at Chalmers University of Technology in Gothenburg, Sweden, where he is leading the Wireless Systems research on air interface and wireless backhaul networking technologies for future wireless systems. He received a Ph.D. in Information theory from Chalmers in 2003, and he has worked at Ericsson AB with core networks, radio access networks, and microwave transmission products. He was involved in the European WINNER and ARTIST4G projects that made important contributions to the 3GPP LTE standards, the EU FP7 METIS and the EU H2020 5GPPP mmMAGIC and 5GCar projects towards 5G and currently the Hexa-X, Hexa-X-II, RISE-6G and SEMANTIC projects towards 6G, as well as in the ChaseOn/Bridge Center antenna systems excellence center at Chalmers targeting mm-wave and (sub)-THz solutions for 5G/6G access, backhaul/ fronthaul and V2X scenarios. His research interests include design and analysis of physical layer algorithms, multiple access, resource allocation, cooperative systems, moving networks, and satellite networks for communications and integrated sensing, actively contributing also to end-to-end architecture and sustainability aspects. He has co-authored 5 books, 104 journal papers, 138 conference papers and 67 public EU projects deliverables. He is founding editorial board member and editor of IEEE JSAC Series on Machine Learning in Communications and Networks, has been Chairman of the awards winning IEEE Sweden joint Vehicular Technology/ Communications/ Information Theory Societies chapter, editor of IEEE Transactions on Wireless Communications, IEEE Wireless Communications Letters, Guest editor of several top journals, organized several tutorials and workshops at top IEEE conferences, and served as coordinator of the Communication Engineering Master's Program at Chalmers.