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TriaGnoSys and Audens Act received ESA contract for DVB-RCS Fade Mitigation Study

Noordwijk, Weßling – TriaGnoSys and Audens Act co-operate for an ESA funded study for progressing Fade Mitigation Techniques for DVB-RCS systems. The project 'Protocols and Signalling for Adaptive Fade Mitigation Techniques (FMT) in DVB-RCS Multi-Beam Systems' was kicked off today under the lead of Audens Act.

About DVB-RCS FMT

The project is aimed at the identification, analysis and optimisation of adaptive Fading Mitigation Techniques (FMT) together with the corresponding protocols, signalling information and formats in order to increase the efficiency of future broadband, DVB-RCS based satellite systems significantly as compared to current systems.

As a consequence, this activity is intended to study and propose appropriate FM techniques including physical layer, signalling, MAC protocols and resource allocation (RA) algorithms for the different link types of a transparent as well as regenerative satellite system scenario and the different services with different Quality of Service (Q.o.S.) requirements, in order to demonstrate the achievable system efficiency under realistic conditions.

The demonstration/assessment need to take into account physical layer impairments, such as channel estimation errors, synchronisation performance, impact of non-linearity, interference, limitations concerning the order of modulation and FEC coding type and rate, as well as traffic, required signalling overhead, imperfections of the resource allocation or induced latency. The performance of the FMT solutions for the various reference scenarios will be demonstrated/assessed through detailed simulations.

The analysis and optimisation of candidate Fade Mitigation Techniques is based on two different satellite system scenarios, the reference system scenarios:

- A system with a transparent/bent-pipe satellite, multi-beam coverage and a high speed forward and a low data rate bursty return link. A multistar network configuration is assumed, i.e., each Gateway supports the users in a certain number of beams, any link between users needs a double hop through the satellite (no inter-beam connectivity).
- A satellite system characterised by a regenerative multi-beam satellite. The on-board regeneration permits high flexibility in user connectivity and permits apparently physical layer format changes between up and down link.

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Furthermore, for both system scenarios three physical layer assumptions, reflecting different degrees of adaptive FMT employment, are considered:

- Benchmark System: The physical layer corresponds to the current DVB-S/RCS standards, i.e. QPSK modulation and concatenated, turbo coding, respectively, with fixed coding rate. The resulting system represents the "benchmark" against which the other systems applying more enhanced FM techniques are compared. It needs to be noted that, because the current standard foresees already the employment of a specific adaptive FMT, i.e., uplink power control, the application of this technique is assumed the benchmark system as well.
- Adaptive System A: In addition to power control, FEC coding with adaptable, variable coding rate is applied, the modulation is QPSK.
- Adaptive System B: Power control and adaptive coding in combination with variable 4, 8, up to16-ary modulation is applied.

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