

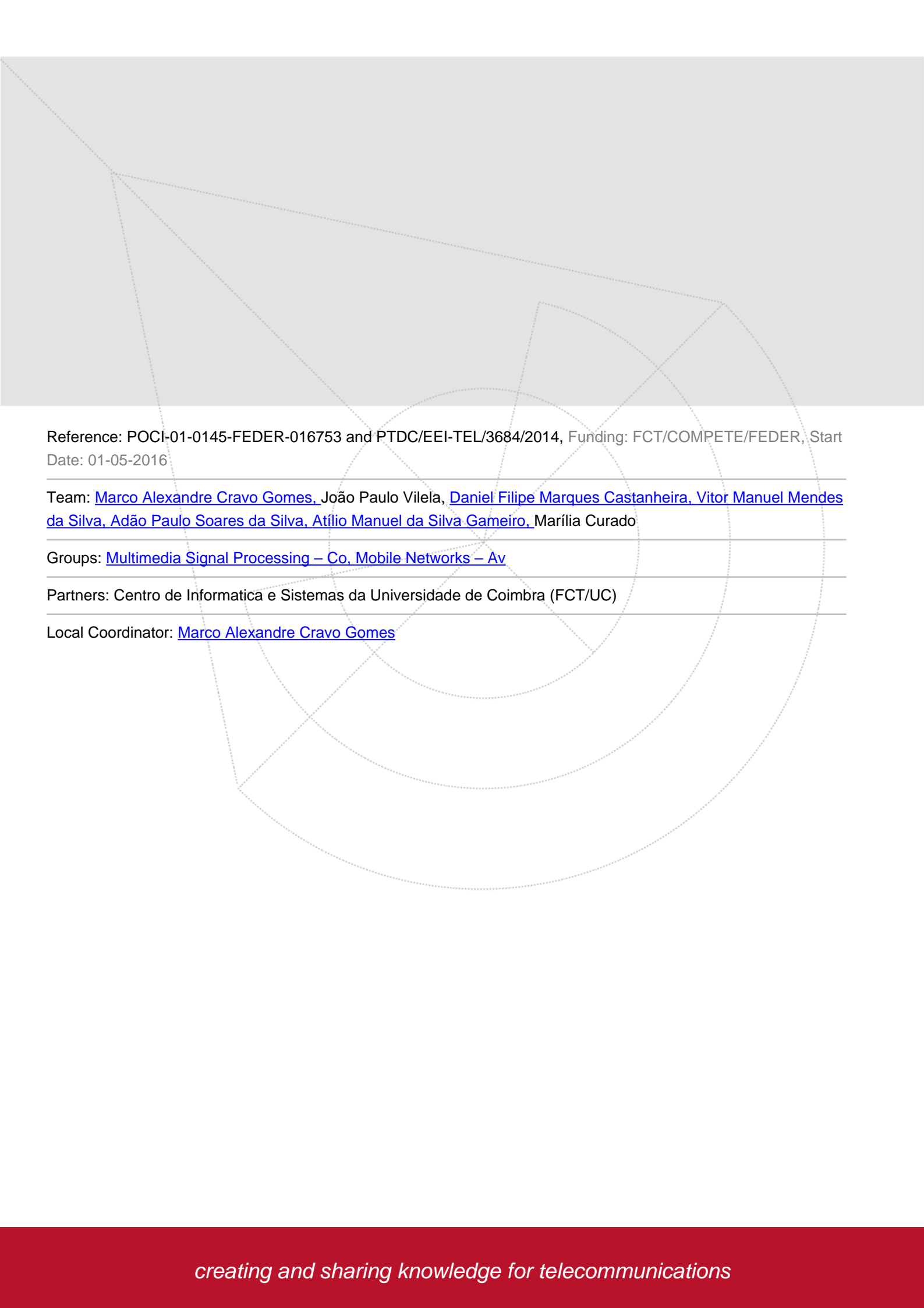
# PROJECT / Securing Wireless Networks with Coding and Jamming

## SWING2



### Main Objective:

The main goal of the SWING (Securing Wireless Networks with Jamming) project is to advance the state-of-the-art on physical-layer techniques to secure wireless networks under eavesdropper adversaries that aim to overhear unintended information. Although current security solutions to provide confidential communication over a shared wireless medium (e.g. Wi-Fi Protected Access 2) appear to remain robust to known attacks, novel attacks are being developed everyday. Moreover, the life-cycle of cryptography-based protocols is bound to the available computational power and, as the computational power increases, so do the resources available to attackers which ultimately leads to the replacement of current standards by new ones. Physical-layer security is gaining interest as a means to provide an extra layer of security that does not depend on computational intractability of operations, but takes advantage of the inherent varying characteristics of wireless channels. This area sparked an interest on the use of interference for secrecy purposes, by using otherwise silent devices (e.g. due to a time-division channel access mechanism) to cause interference/jam possible eavesdroppers. This brings a set of challenges such as how to cause enough interference without compromising legitimate communication, how to properly select available jammers/interferers, how to reduce the high energy cost of jamming at all times, how to motivate users to cooperate, and so on. The expected outcomes of this project address some of these challenges, in particular we plan to develop (a) advanced jamming schemes combining interference with coding mechanisms and spread spectrum methods for enhanced wireless secrecy at a lower energy-cost, (b) interference alignment to reduce the impact of interference on legitimate communication, (c) cooperation enforcement mechanisms to motivate users' cooperation in jamming eavesdroppers, and (c) a prototype of the developed techniques implemented and evaluated in a software radio test-bed. Our team of computer scientists and electrical engineers aggregates expertise in wireless modeling and protocol implementation, error correcting codes, parallel decoding, and cooperation enforcement, all of which are necessary to pursue the objectives laid out for the project.



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