# SCOS Operational Modes

To allow great system flexibility with ability to meet multiple unknown use cases, but also allow a simplified task-specific operational use, two Operational Models are proposed:

**Mode 0 (Bootstrapping Mode)**

This mode brings up an SD, and allows it to associate with an SM, and be given either a scan recipe, or be instructed to perform a preconfigured scan, and then publish the data. This is the minimal mode of operation.

**Mode 1 (Tasking Mode):**

This is a full-featured mode suitable for a wide variety of applications, where the SM acts as a management device to allow multiple different users (SCOS Clients) to do chosen scan activities on a single or distributed set of SDs. This mode incorporates the full set of functions of the standard.

**Mode 2 (Heartbeat Mode):**

This mode is suitable for cognitive radio implementations, where a sensing device is used in a semi-fixed configuration, reporting channel occupancy to the radio management system over heartbeat messages for low overhead, with some capability to perform specific scans as a task when instructed by a SCOS Client through the SM to let a radio supervisor system request a detailed custom scan.

Mode 2 is a subset of Mode 1, using the same interfaces, primitives and protocols, but typically operating in a fixed configuration for most of the time.

**Mode 3 (Offline Mode):**

Offline mode would be used where the Sensing Device(s) are operating without constant connection to the SM or other control systems. This mode would enable Sensing Devices to be given a task schedule when they associate with the SM, and then be able to operate offline from the SCOS management systems for long periods of time, storing data locally on the SD itself, and synchronizing data and tasks later when re-associated to management systems.

Mode 3 uses all of the command and control methods available in other modes, but where there is modification made to timeouts or other operational parameters in the control systems.

**Mode 4 (Reporting Mode):**

Mode 4 is a “passive listening” mode that is light (command&control system supports authentication and “start/stop” and “user/destination” messages); or ultralight mode (which only supports data transfer system).

This mode is intended for systems that have sensing capability, and can transmit sensing data back to the Data Manager according to a fixed configuration, and where a sensing task is established by the owner/operator of the sensing device either manually or a simple control mechanism.

This mode would be suited to network operator radio equipment that has sensing capability, but is not part of a SCOS network as proposed in this standard. The data provided by devices in this mode would be used as data gathering units by network operators and national regulators, provided through transmission of a regular set of scans in the bands that equipment is designed to provide transceiver services in. Examples could be 3GPP-compliant mobile base stations, or Wi-Fi equipment with sensing (e.g. 802.11ac).











