

# Smart Interaction Device (SID)

## Natural, multi-modal interaction with unmanned platforms



### Smart Interaction Device

Lack of intuitive interfaces is inhibiting wider adoption of unmanned systems on the battlefield. Current operator interfaces require heads-down time from a highly trained operator to control the platform, minimizing the platform's utility in dynamic environments. More intuitive interfaces are needed to make interaction between users and unmanned platforms more natural and easier to use such that communications are more like that of interacting with a teammate. The Smart Interaction Device (SID) provides an intuitive, multi-modal interface by providing an intelligent software layer between the operator and the unmanned platform.

### Multi-Modal Interaction

SID enables a user to interact with unmanned platforms in multiple modalities, including speech, sketch, and gesture input, and provides multiple modes of feedback to the user. Interactions are flexible to the domain – e.g., gesture may be in the form of pointing on a screen or hand/arm signals. SID can manage these different forms of input, merge them together and make sense of them in the current situation. We have tailored SID to numerous different ways of interacting, using over a dozen different input/recognition technologies.

### Context-sensitive Dialogue

With SID, interaction between an operator and an unmanned platform is framed as a dialogue, which adds another layer of naturalness to the interaction. Dialogue enables the system to make sure it understands operator's intent before executing the task. If there are ambiguities or missing information in the user's inputs, SID asks for clarification. SID answers status requests about the unplanned platform such as current task or location. SID can also provide status to the user without prompting (e.g., based on SOPs), or when the platform runs into problems during execution. This kind of transparency and interaction is necessary to build operator trust.

### Platform-agnostic interaction

SID helps manage the differences between platform capabilities without requiring the operator to know the details of platform tasking. SID takes the user's high-level command and translates it into commands appropriate to the target platforms, which may have different capabilities or command protocols. SID handles these differences: it lets the user think in user terms while SID manages the low-level platform details. By the end of 2016, we will have integrated with 14 different unmanned vehicles (air, ground) and multiple DoD control stations.

### Ultra-portable device or device-less interaction

SID capabilities have been demonstrated with laptops, smartphones, tablets, and smart watches, providing an a variety of ways to interact with unmanned platforms. Where sensors are available on the platform, SID also allows for "device-less" interaction, freeing the user from the additional weight burden of additional worn devices/sensors.

### Robust Technology

SID is based on the Soar cognitive architecture that has been used in numerous DoD applications since 1992. SID has been evaluated in 9 different DoD-sponsored experiments, and has shown significant improvements in task speedup and task completion compared to traditional control interfaces. SID was awarded a 2010 Army SBIR Achievement Award.

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