

metal inside of Ecoflex channels, to thereby form the coding electrode patterns. The detailed fabrication process of the stretchable interface 3302 is illustrated in Figure 39.

The output signals from the flexible and stretchable interfaces 3300, 3302 are depicted in Figures 33(c) and 33(d), respectively. From the results, it can be observed that the coding information along the four directions can be clearly interpreted from the generated peaks for both devices. According to the above demonstrations, the single-electrode interfaces according to certain embodiments exhibit outstanding scalability, showing great potential in diverse control, security, flexible and wearable applications.

Figures 32(a) and 32(b) show the generated signals for rotation control in the drone control interface of Figure 13, and the enlarged view of the output peaks and their time intervals. When sliding left, there are six peaks in the generated signal and their time intervals are decreasing. Then when sliding right, their time intervals are increasing. Figures 32(c) and 32(d) show the generated signals for the up/down control and enlarged view of the output peaks and their time intervals. When sliding up, there are seven peaks in the generated signal and their time intervals are decreasing. Then when sliding down, their time intervals are increasing. The trend of the time intervals in rotation control and up/down control is illustrated in Figure 37.

*Fabrication of the interface 3300* PTFE thin film was first cut into the size of the designed interface. Then aluminum tape electrodes were attached on the backside of the PTFE thin film, forming the structure layout of connected spider-net. All the electrodes are connected together, and thus there is only one sensing electrode for the BISNC interface. After that, Ecoflex™ 00-30 solution with mass ratio of 1:1 (Part A: Part B) was mixed thoroughly and coated on top of the electrode as insulation and protection layer. Last, the interface was cured overnight at room temperature.

*Fabrication of the stretchable interface 3302* The process started from moulding substrate 3902 preparation and cleaning. Next, foam tapes 3906 were attached