Figure 8 on page 22 of the attached paper implies that the surface temperature of the Space Shuttle reaches a value of $T_s \approx 1200$K for a Mach number, $M \approx 25$, and an airplane wing reaches $T_s \approx 500$K at $M \approx 3$.

The resulting infrared luminosity of the surface of a UAP of radius $r$, moving at $M \approx 3$, would be:

$$L_{IR} \sim \sigma T_s^4 \times \frac{\pi r^2}{s} = 10^{11} \frac{\text{erg}}{s} \times \left(\frac{r}{1\text{m}}\right)^2$$ for $T_s \approx 500$K

where $\sigma = 5.7 \times 10^{-5}$ erg/cm$^2$·s·deg$^4$ is the Stefan-Boltzmann constant.

For a telescope of diameter, $d$, at a distance, $D$, this gives a photon count rate of,

$$\frac{dN_{IR}}{dt} = \left(\frac{L_{IR}}{3K T_s}\right) \times \left(\frac{\pi d^2}{4 \pi D^2}\right) = 3 \times 10^4 \frac{\text{photons}}{s} \left(\frac{r}{1\text{m}}\right)^2 \left(\frac{d}{1\text{m}}\right)^2 \left(\frac{D}{10\text{km}}\right)^{-2}$$

at a blackbody wavelength of,

$$\lambda_{IR} \sim 3\text{\mu m} \left(\frac{T_s}{500\text{K}}\right)^{-1}$$ for the peak of $B_\lambda$.

This flux is larger by an order of magnitude than the thermal emission rate off surfaces at room temperature and can easily be detected with IR sensors.