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Smart, swift, subtle: The implications of incipient advancements in behavioral analytics/forecasting upon specialized aerospace engineering

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Recent demonstrations in military, academic, and private sector research are suggesting the strong potential for technologies in social intelligence gathering and forecasting, as well as new forms of covert social, political, and economic influence/disruption. Though the specifics may vary depending upon how these technologies are regulated and the precedents established for their inter-state use, they are likely to create new demands in aerospace design. The most immediate impact would seem likely to be in a wider application of drones for targeted social data collection (where open source data proves insufficient) and/or influence. Not only is this likely to further fuel demand for subtlety in drone operation, but it may create new sorts of design requirements. For example, in the event of opposed drone objectives (such as in interstate conflict), it may be useful to disrupt/disable hostile drones without alerting nearby populations of the conflict (a task complicated by the fact that most social activity which would be the subject of observation takes place in urban areas.) Developments such as this are considered in the lights of various scenarios differing in terms of how the relevant technologies advance and are implemented.

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Potentiality of computational fluid dynamics for the dynamics of spreading of liquids on solid surfaces

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The phenomena of the spreading of liquid on a solid surface are complex. The aerospace industry is moving towards the use of composite materials for carrying of the structure of its aircraft. Different agents are made for facilitating demoulding and applied to the mold before each production cycle of composite aerospace part. This study is outcome of that context studying wetting phenomena in surfaces. We develop a CFD model, to simulate the time evolution of spreading drops on solid surfaces (drop base radius vs. time curve). The effect of wettability of the substrate on droplet spreading is investigated by considering different surfaces. Dynamic surface tension, surfactant adsorption and transport phenomena are included in the computational model. The CFD simulations are quantitatively compared with previously published experimental results from other research groups. Our numerical results compare very well with experimental data.

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