

Hybrid Air Plasma Water Cleaning: Reducing Water

Consumption & Increasing Cleanliness of Mirrors, in Concentrating Solar Power Plants

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Abstract

Approximately 33.3 GW of new solar thermal capacity was commissioned in 2018, increasing total global capacity by 2 % to around 480 GW and this trend is set to increase; however the regions that are most suited for Concentrating Solar Power (CSP) plants are typically arid and dusty, leading to high rates of soiling of the collector mirrors [1,2]. A standard 50 MW CSP power plant typically uses 25,000,000 litres of water per year to clean the mirrors. The mirrors are washed on average once every two weeks, but this can be more frequently with sand storms and adverse weather conditions. Under normal conditions, daily soiling results in a 0.5 % loss of reflectivity. A perfect, new, CSP mirror has reflectivity values of 97%. Thus, after two weeks without cleaning, the mirror reflectivity will be less than 90% and in some cases far lower [3]. An innovative, hybrid, air plasma water cleaning technology is being developed in Cranfield University with Adtec Plasma Technology, which is capable of cleaning Concentrating Solar Power (CSP) mirrors, at the same speed as conventional cleaning, whilst using only half of the amount of water that other cleaning technologies use. This disruptive technology is projected to save a billion litres of water per year around the world in CSP power plants [4].

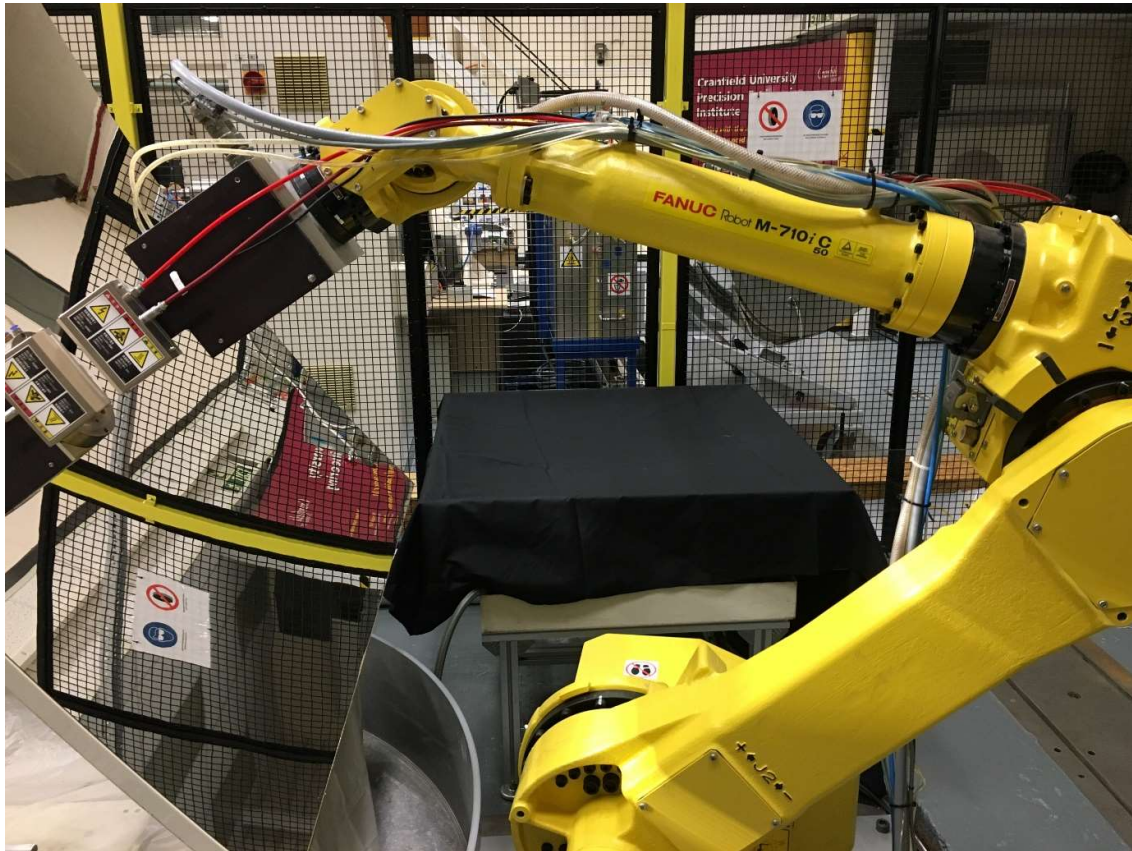


Figure 1: Hybrid Air Plasma Water Cleaning Concept

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