

Abstract Submitted  
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**Guided radar system for arc detection: new results at DIII-D** S.M. SALVADOR, R. MAGGIORA, Politecnico di Torino, Italy, R.H. GOULDING, J.A. MOORE, Oak Ridge National Laboratory, TN-USA, R.I. PINSKER, A. NAGY, General Atomics, CA-USA — A guided radar arc detection and localization system has been designed, fabricated, installed in the feed line to one of the resonant loops on the 285/300 FW antenna, and successfully tested during vacuum conditioning. The system injects a train of binary phase-modulated pulses at a carrier frequency of 25 MHz up-shifted to around 450MHz into the main high power transmission line connected to the antenna through a septate coupler and a circulator. The pulses are reflected by arcs, and the time delay provides the distance to the arc. The reflected signals are analyzed in real time, with a time response sufficient to provide active arc detection as well as localization. RF pulses have been injected into the antenna at a power level of up to 650kW. The arc location was varied by either puffing gas into the vacuum vessel, in which case arcs always occurred in the antenna, or injecting RF without a gas puff, in which case the arcs almost always occurred in the transmission line feeding the antenna. The localization obtained during these initial tests had a relatively low resolution of about 2 m, but arcs occurring inside or outside the antenna could clearly be differentiated and corresponded with the expected location. The septate coupler proved fully compatible with the antenna feed and matching network and improved performance significantly in comparison to the use of directional couplers.

Daniele Milanesio  
Politecnico di Torino, Italy

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