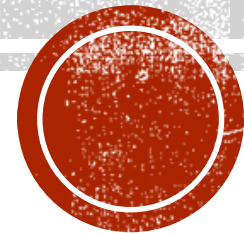




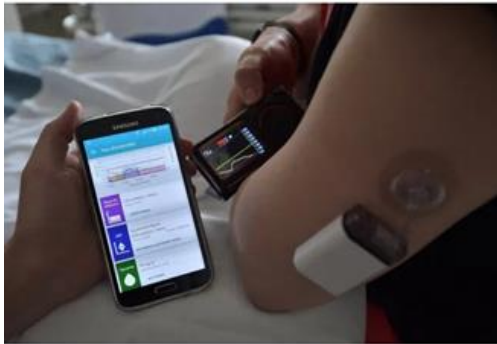
TOWARD OPERATIONAL SAFETY VERIFICATION VIA HYBRID AUTOMATA MINING USING I/O TRACES OF AI-ENABLED CPS

Imane Lamrani, Ayan Banerjee, Sandeep K.S. Gupta.
ilamrani@asu.edu



**IMPACT LAB, CISDE
ARIZONA STATE UNIVERSITY.**

EMERGING SAFETY ISSUES OF AI-ENABLED CYBER-PHYSICAL SYSTEMS (CPS)



Getty

A 'breakthrough' device which has been described as an 'artificial pancreas' is to go on sale this year – allowing diabetic patients 'greater freedom'.

Artificial Intelligence will Make the Workplace more Human, not Less. This is the Gift of AI to Mankind

As a result, work will also be more rewarding. Organizations will become more collaborative and increasingly agile and nonhierarchical. Higher employee satisfaction, more creativity, more free time, reduced employee churn, and increased customer satisfaction will be some of the positive

consequences of AI in the workplace. AI will make the workplace more human, not less. This is the gift of AI to mankind.



Serious safety lapses led to Uber's fatal self-driving crash, new documents suggest

The fatal crash in Tempe, Arizona, in 2018 comes into sharper focus



Top Volkswagen executives charged with market manipulation in emissions scandal

The scandal has cost the German automaker more than 30 billion euros since September 2015

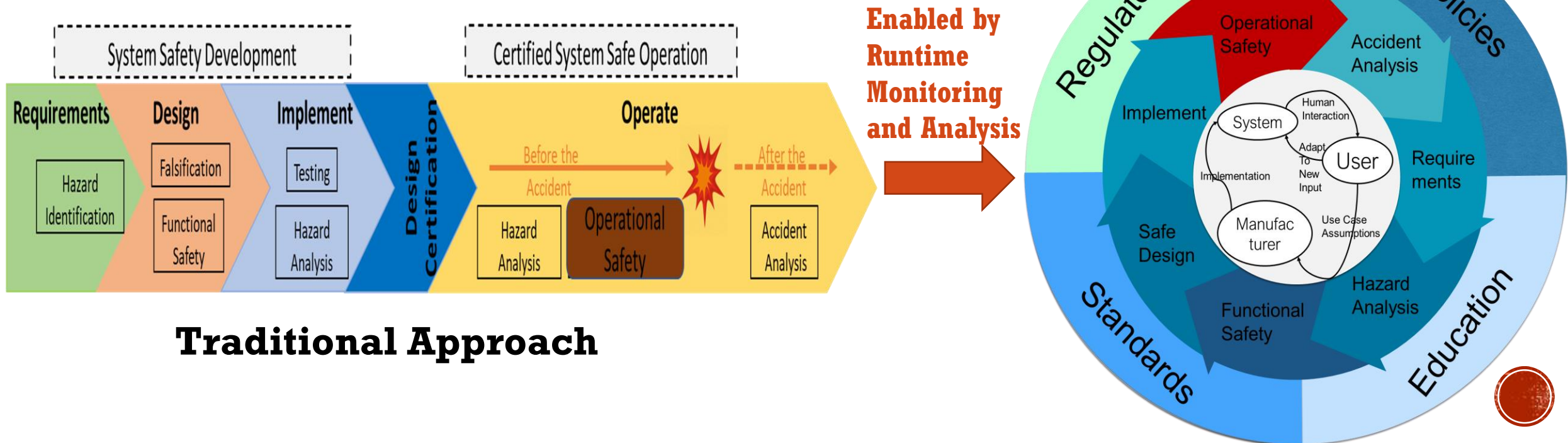
Boeing Fires C.E.O. Dennis Muilenburg

Boeing has been mired in crisis since the crashes of two of its 737 Max jets killed 346 people.

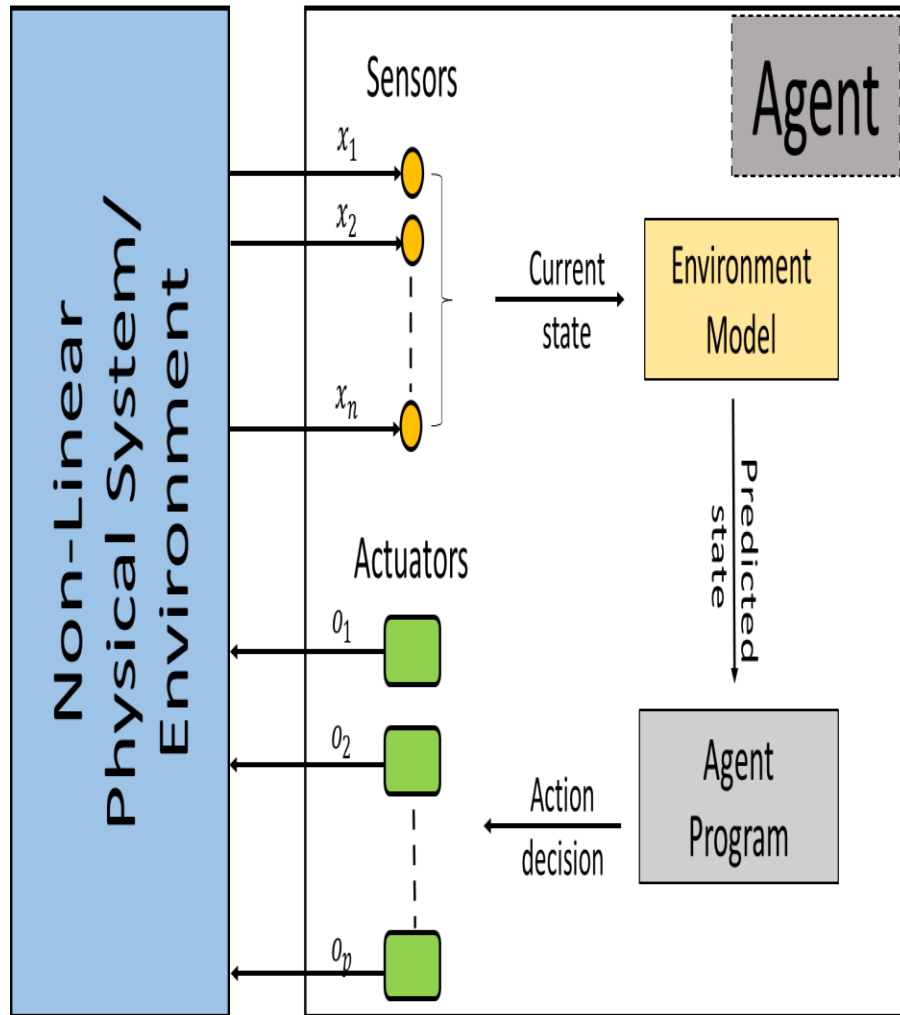


ITERATIVE HOLISTIC APPROACH FOR OP SAFETY

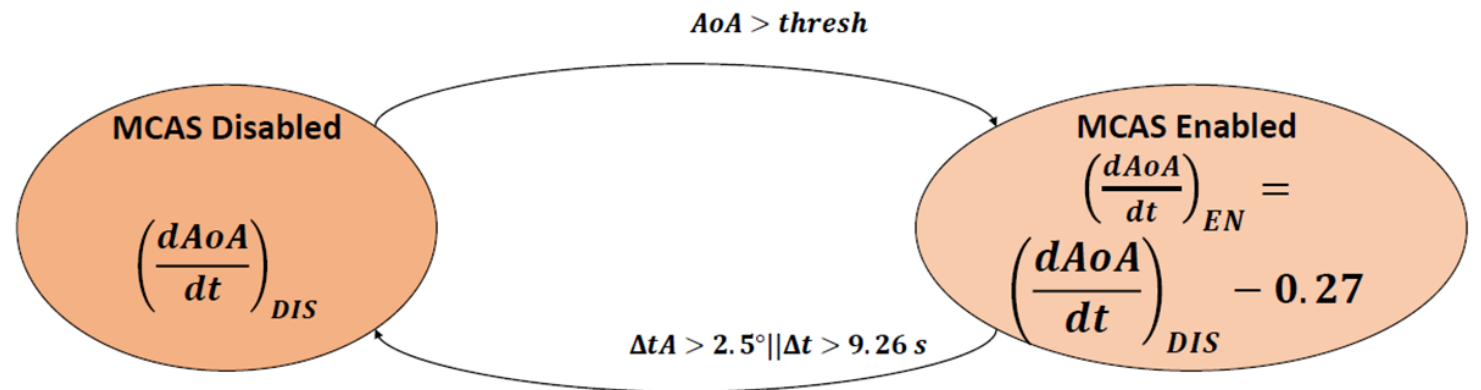
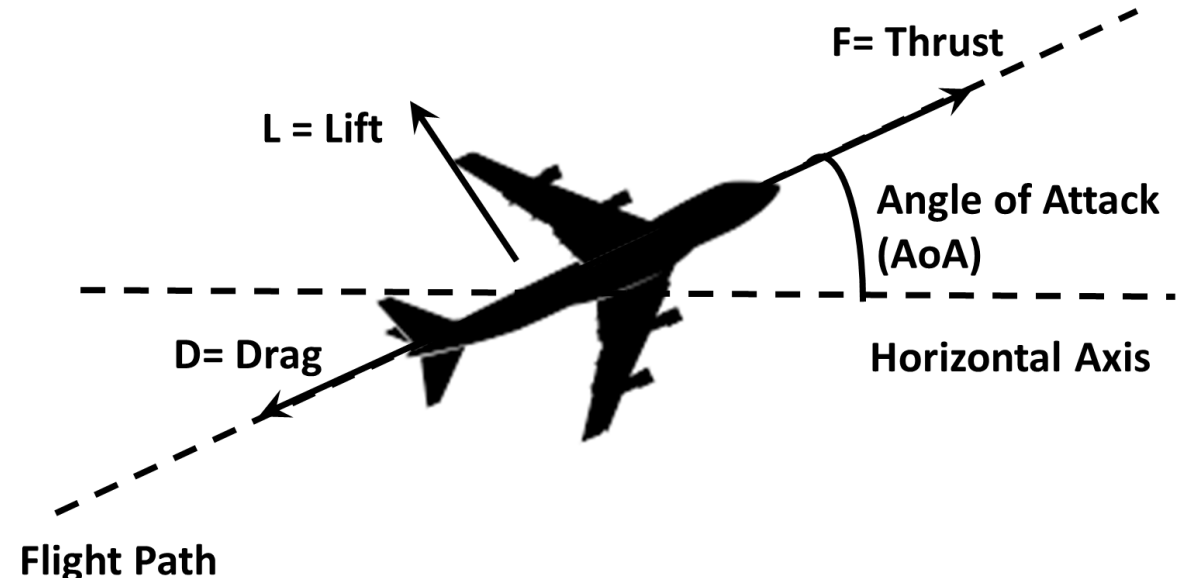
Operational Safety: Ensuring conformance between the out in the field operation of the AI-enabled CPS and its safe certified behavior.



AI-ENABLED CPS MODELING



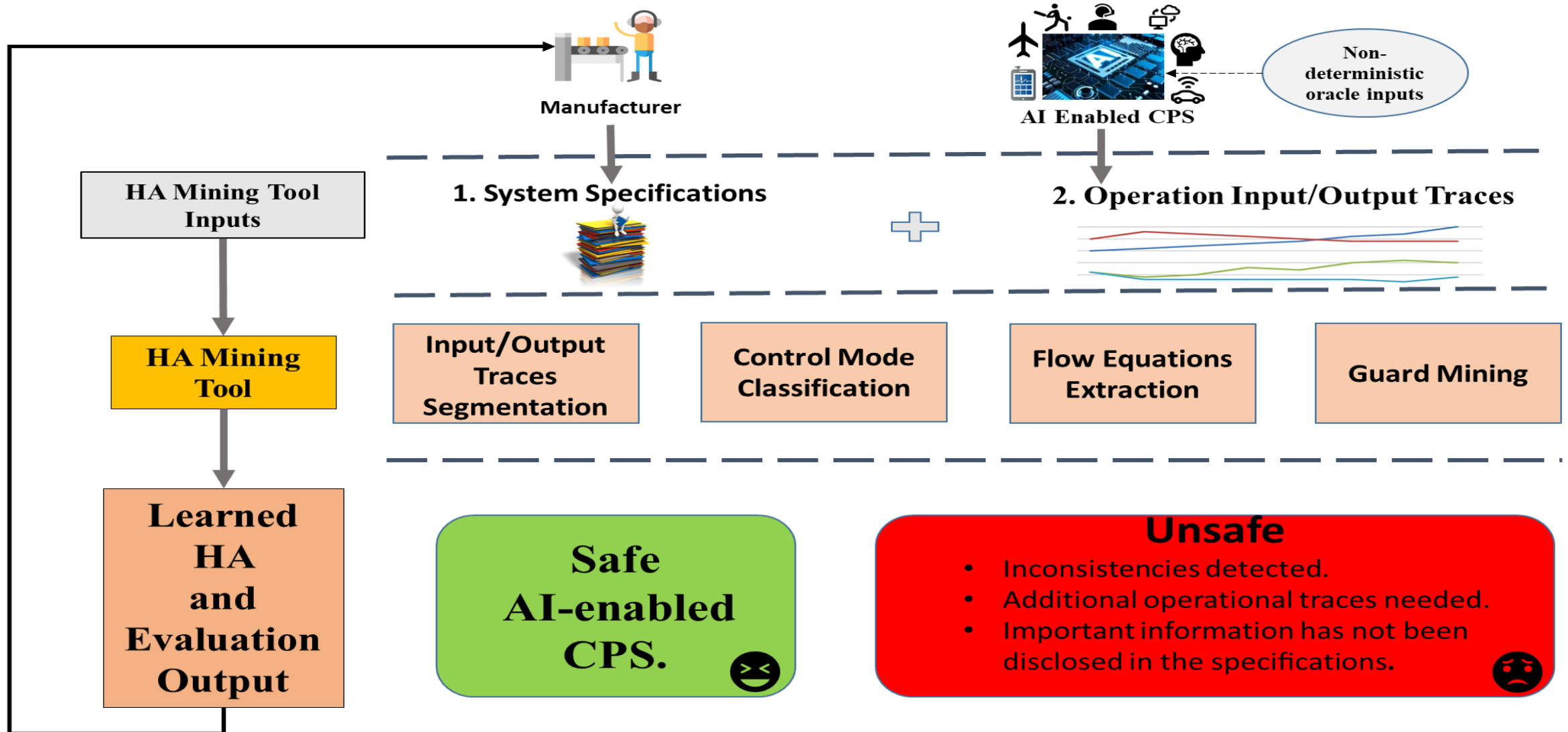
AI-ENABLED CPS MODEL



Hybrid Automaton (HA) Model of Maneuvering Characteristics Augmentation System (MCAS).



OPERATIONAL SAFETY VERIFICATION FROM I/O TRACES



HA: Hybrid Automata – a formal approach to represent both discrete & continuous behavior of CPS.

