



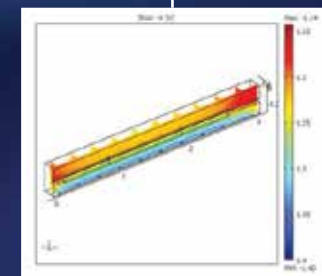
D019366_8285

2014

Dedicated EGR

Dedicated EGR is a novel engine architecture up to 15% more efficient than mainstream engines while simultaneously improving performance. It could allow manufacturers to cost-effectively address future, more aggressive fuel economy and exhaust emissions standards.

- 20 IRs from 2001–21
- 3 patents



D026608



D022025

2015

Ranger

Ranger produces precise position and orientation measurements using a down-facing camera and novel localization algorithms. Ranger images the unique “fingerprint” of on/off road and off-planet surfaces, allowing precise automated driving, precision rail and logistics applications within 1-2 centimeters, even where GPS has poor performance or fails.

- 6 IRs from 2011–19
- 1 patent
- SwRI Investment: \$1.25M
- ROI: \$6.8M



D026638

2016

Time REsilient System (TRES)

Using inexpensive hardware and sophisticated software, TRES was designed to safeguard critical infrastructure against GPS jamming and spoofing to maintain the precise time synchronization needed for energy infrastructure, financial and transportation applications.

- IR in 2013
- Patent # 10,310,091



D022686_7671



D022179_8774

2017

Smart Leak Detection (SLED)

The SLED system autonomously monitors pipelines and other facilities for methane and liquid hydrocarbon spills. Using algorithms to process sensor images, SLED can autonomously pinpoint small leaks before they become major problems, with minimal false alarms.

- IR in 2015
- Q-LIR 2018 SLED-Methane
- IR 2018 SLED-Methane
- Patent # 10,657,443

High Power Impulse Plasma Source (HiPIPS)
HiPIPS technology efficiently generates high-density, high-flux plasmas at low temperatures and atmospheric pressures. These plasmas are used to generate coatings and advanced materials as well as to augment processes for decarbonization, algae remediation and critical element recovery, among others.

- 2 IRs from 2012–2013
- 2013–2016 DARPA
- 7 follow-on contracts
- Patent # 10,440,808
- ROI: \$6.8M



D023699_1390



D024251

2019

AF-369 VHF/UHF Terrestrial Direction-Finding Antenna

The AF-369's sleeved electric dipole antenna boosts usable bandwidth by 80% over conventional dipoles, improving capability while reducing costs for the specialized terrestrial direction-finding antenna.

- IR in 2017
- 12 antennas deployed
- 10 pending orders

Lotus Superhydrophobic Compositions and Coating Process (LotusFlo™)

LotusFlo™ is a superhydrophobic coating process designed to prevent clogs in offshore drilling pipes by various substances present in crude oil and salty liquids. Applied to pipes under vacuum, the long-lasting coating repels liquids and is environmentally friendly.

- Q-LIR in 2010
- Related IR in 2019



D025427



D022710_6072

2020

System Performance and Real Time Analysis (SPARTA)

SPARTA's advanced measurement and analysis software denies accurate targeting information to a combatant. SPARTA evaluates fighter aircraft defense systems, ensuring the correct counter-measure to a given radar “ding.”

- PDIRs from 2012–19
- 8 different contract awards
- Supporting 4 different weapon systems

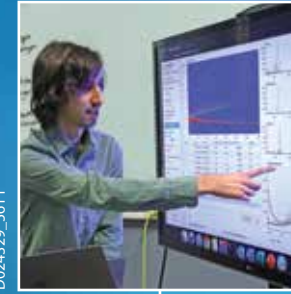
Laser Coating Removal Robot (LCR)

SwRI developed the LCR robot to use environmentally friendly laser techniques to strip paint and coatings precisely and efficiently from a broad range of military and commercial aircraft, from fighter jets and helicopters to cargo aircraft.

- IRs from 2010–2013
- 6 patents



D026083



D024329_5611

2021

Eco-Mobility with Connected Powertrains

Connected and automated vehicle (CAV) technology helps passenger and fleet vehicles reduce energy consumption, providing 20% energy savings on a plug-in hybrid vehicle in real-world driving conditions by optimizing power management, routing and speed.

- 2 IRs from 2019–2021
- 4 external contracts

Catalyzed Diesel Exhaust Fluid, (Cat-DEF™)

Cat-DEF™ is a catalyst- and surfactant-modified diesel exhaust fluid solution that improves nitrous oxide and carbon dioxide emissions by reducing undesirable deposit formation in exhaust systems.

- IR in 2017

Floodlight™ Non-Targeted Analysis System

Floodlight™ software allows efficient discovery of vast numbers of chemicals present in various substances including food, air and consumer products. The cheminformatics machine learning tool provides deep analysis of two-dimensional gas chromatography mass spectrometry and metadata.

- PDIR in 2019
- Current version: Highlight
- 3 papers published
- 2 papers in progress

2023



D025611_8510

Wideband Conformal Continuous-Slot Antenna Array

SwRI's state-of-the-art Wideband Conformal Continuous-Slot Antenna Array technology provides naval ships with high-performance, high-frequency direction-finding (DF) and signal acquisition while conforming around shipboard-supporting mast structures.

- IR in 2019
- Array allowing a cost-effective retrofit of a class of naval ships
- Patent # 11,489,267

Since 1971, Southwest Research Institute has earned 52 R&D 100 Awards. These SwRI developments were recognized by R&D World magazine as among the 100 most significant technical accomplishments in a year. Considering the last decade of awards, SwRI's Internal Research & Development program played a role in 14 of the 15 awards received in that period, illustrating the value of IR&D. These included special categories such as presidential discretionary internal research (PDIR), targeted (TIR), disruptive (DIR) and quick-look (Q-L) projects. Many of these programs resulted in follow-on contracts.

