

NATURAL GAS:

Clean Energy to Keep America Going Strong

Exploration and Production Technology Benefits Non-Industrial Research & Innovation

Meeting the challenges of finding and producing energy to heat our homes, fuel our cars, run our computers, and drive our economy has fostered inventions and technology that have uses in many other areas. Serving as an incubator for innovation and acting as a catalyst for progress, the energy industry plays a vital role that is far reaching. It is a large developer and consumer of leading edge technologies that have numerous spin-off effects in other areas of our economy covering a wide range of industries and applications. These innovations have applications in such fields as defense, navigation, marine biology, geology and environmental sciences.

Drilling and coring technology is critical to the work of earth and marine scientists.

- The process of drilling deep into the earth's crust and extracting long "core samples" from rock and other geologic formations penetrated by the drill bit has been used by petroleum geologists for over a century to determine the location of oil and gas.
- Now scientists in Antarctica take core samples from ice caps 4000 meters thick to determine what weather was like 7,000 years ago while others examine cores of this ancient ice drawn for clues to primitive fungi and bacteria that could survive the harsh conditions in outer space — an exciting new field known as astrobiology.
- The Joint Oceanographic Institute Ocean Drilling Project's international team of scientists has sailed around the world in a refurbished oil drillship conducting valuable oceanographic research. Among their findings: revealing insights into plate tectonics; evidence that a meteorite collided with earth 65 million years ago; and discovery of teeming bacterial life where none was previously thought to exist in sediments a half mile beneath the ocean floor.

Remotely Operated Vehicles (ROVs), first designed to construct and repair undersea pipelines and offshore rig foundations, are now used extensively by oceanographers, telecommunications cable layers, treasure and salvage-hunters, and others.

- Since the 1970s the offshore oil and natural gas industry has led the way in advancing ROV technology, driven by the industry's need to be able to perform more complex tasks in ever-deeper waters.
- Now ROVs are in high demand by scientists who use them to study undersea geological fault lines and plate tectonics, conduct maintenance and repairs on subsea structures, and engage in important deepwater salvage such as raising the Titanic and recovering information about aircraft lost over the ocean, including the TWA Flight 800 disaster.
- Exploration technology is also opening doors to lifesaving new drugs. Biomedical marine researcher Shirley Pomponi said that the recent discovery of an anti-cancer drug made from chemicals found only in a deep-sea sponge may be attributed in part to developments in technology, "like submersibles that go deeper and stay down longer, and remotely operated vehicles, [that] have allowed us to explore regions of the ocean we have never seen before."¹

The petroleum industry and the Department of Defense have been sharing advances in geophysical technology for over 30 years now — advances that have enabled the efforts of earthquake scientists, archaeologists, and even space scientists.

- Satellite or aircraft-based "remote sensors" are now able to provide accurate geologic data. This technology has applications as diverse as helping farmers know which of their crops needs more water. Magnetic Anomaly Detectors are remote sensors able to detect both near-surface mineral deposits and telecommunication-threatening magnetic storms related to activity on the sun — as well as detect enemy submarines.

Investment in research and development by the petroleum industry will continue to provide scientific advancements with applications far beyond finding, producing and transporting natural gas and oil.

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¹ Dyras, Cheryl Lyn. "Study of Marine Creatures Yields Human Benefits," *The Washington Post*, December 18, 2000.