

CAREER DAY

**HAVE YOU EVER
CONSIDERED A JOB IN
UNDERWATER ROBOTICS?**

**Robert Wernli
13 October 2006**

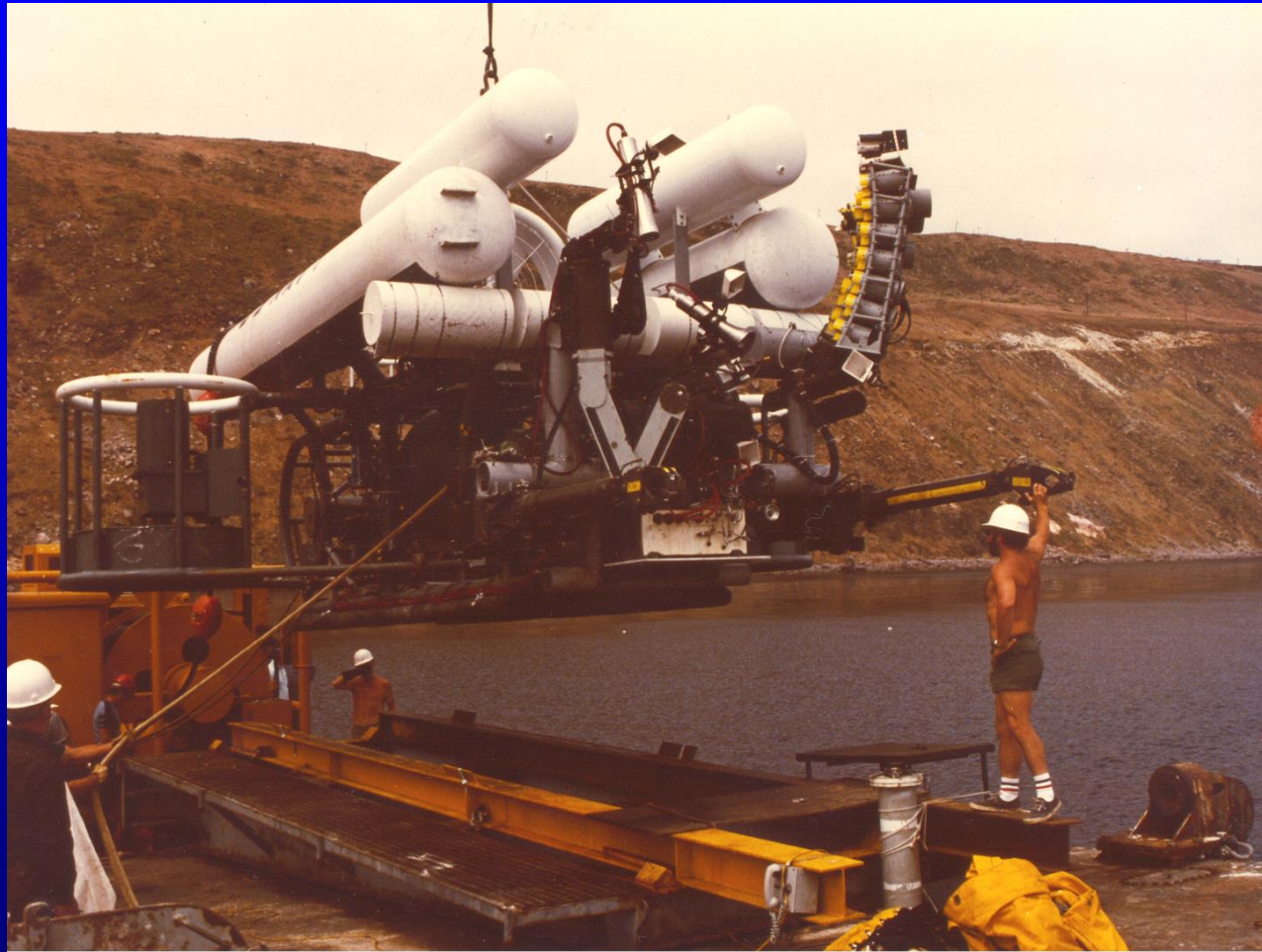
WHAT JOBS EXIST?

- DIVERS
- VEHICLE OPERATORS
- VEHICLE DESIGNERS
 - ELECTRICAL ENGINEERS
 - COMPUTER ENGINEERS
 - MECHANICAL ENGINEERS

TODAY'S PRESENTATION

- WHO AM I?
- HOW DID I GET STARTED?
- INDUSTRY DISCUSSION
- DOES IT PAY TO STAY IN SCHOOL?
- HOW ABOUT ENGLISH?

WHO AM I?

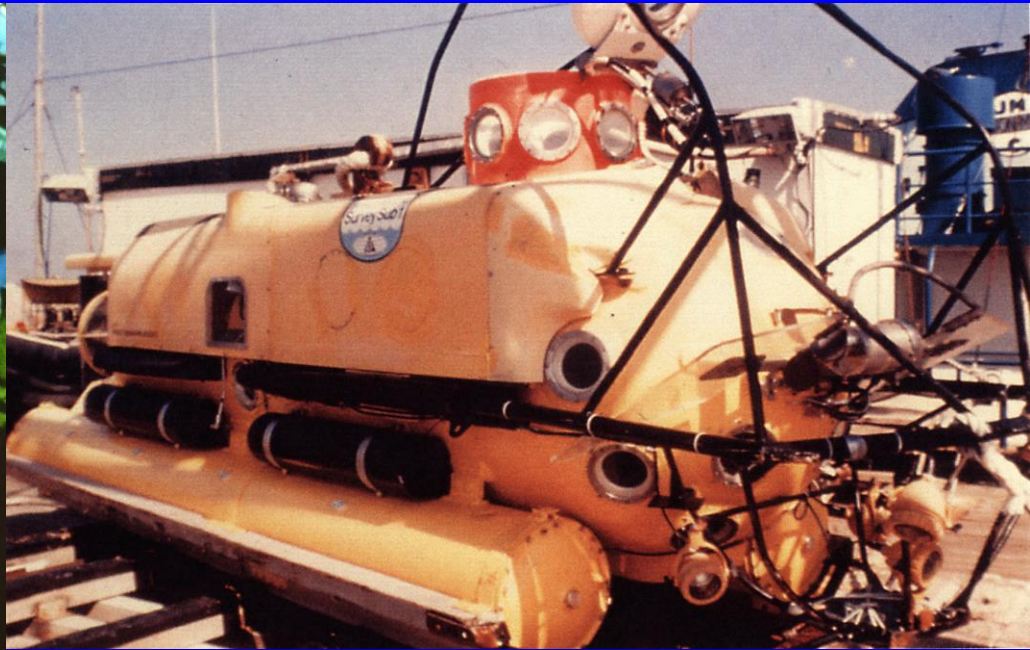


HOW DID I GET STARTED?

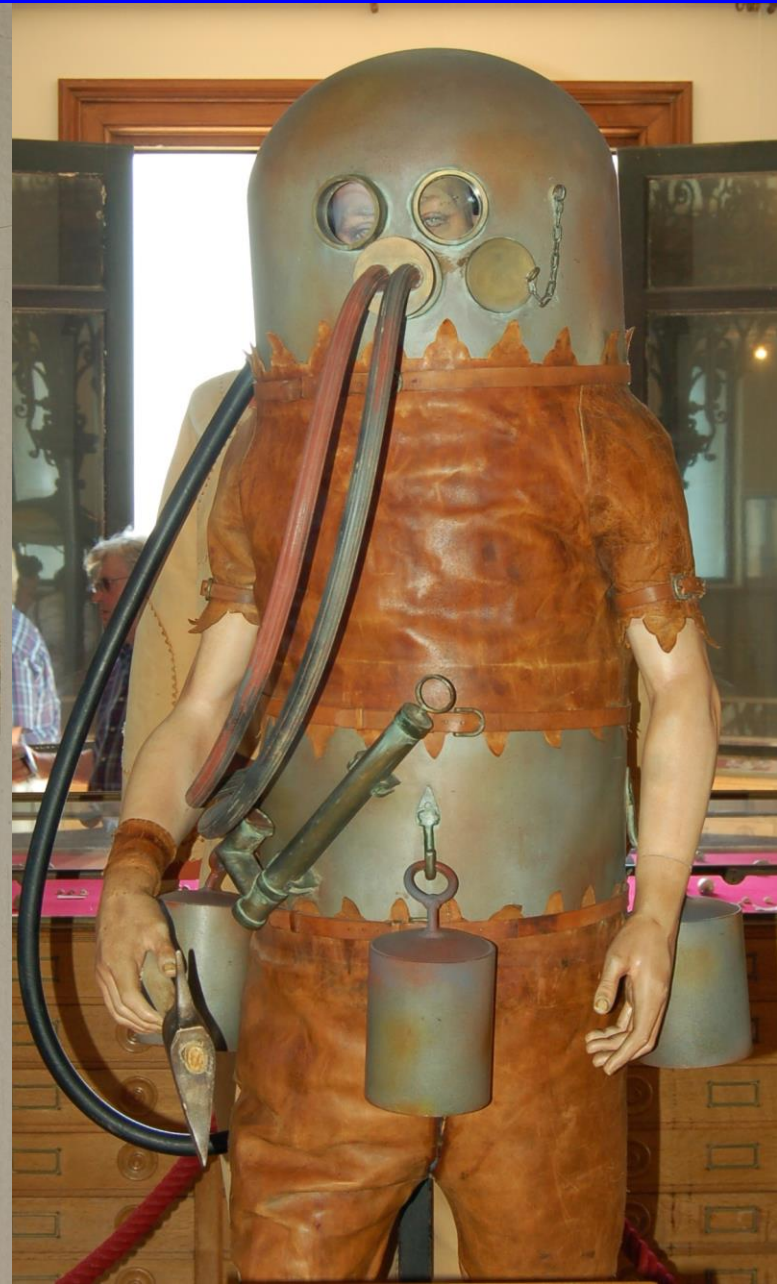
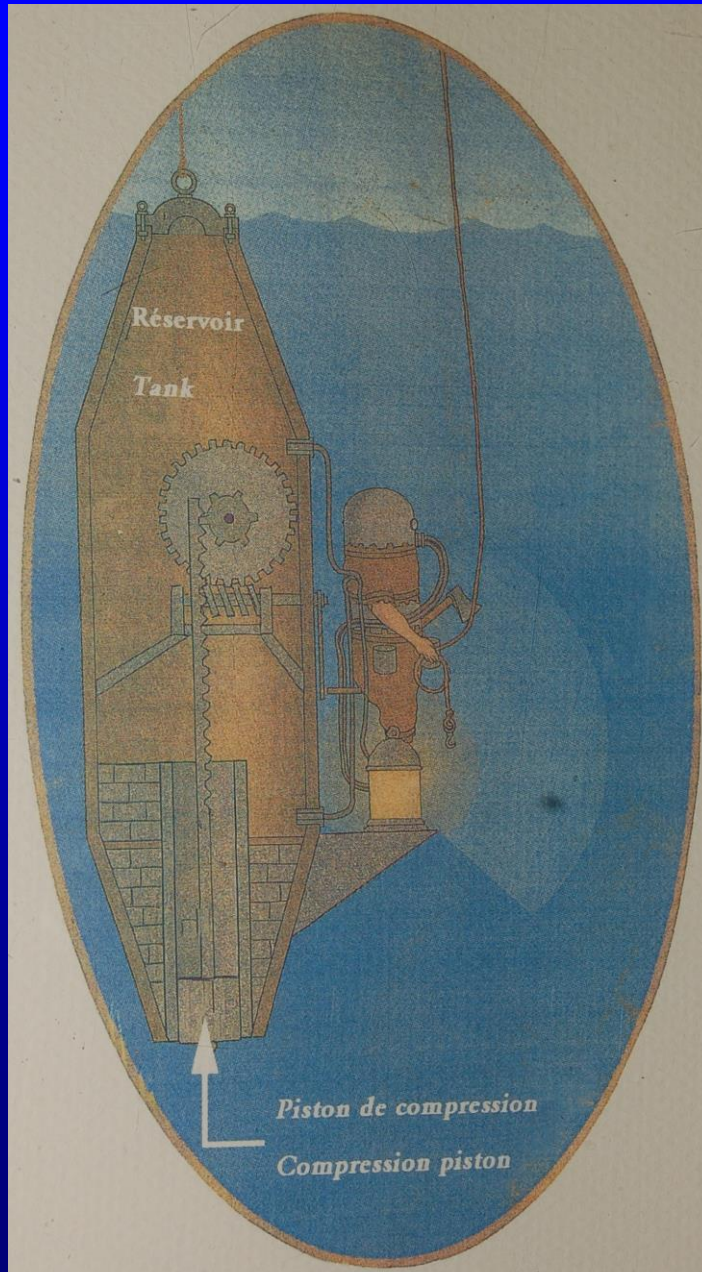
- DID I REALLY WANT TO BE AN ASTRONOMER?
- WHAT IS AN ENGINEER?
- WHAT IS A TECHNICIAN
- DO YOUR RESEARCH
 - TEACHERS AND COUNSELORS
 - FRIENDS AND EXPERTS
 - INTERNET

LET'S TALK ABOUT THE UNDERWATER DIVING AND ROBOTICS INDUSTRY

Types of Underwater Intervention



Klingert's Diving Suit 1797



**The 1950's & 60's
Offshore Oil Exploration
Spawned
The Offshore Diving Industry**

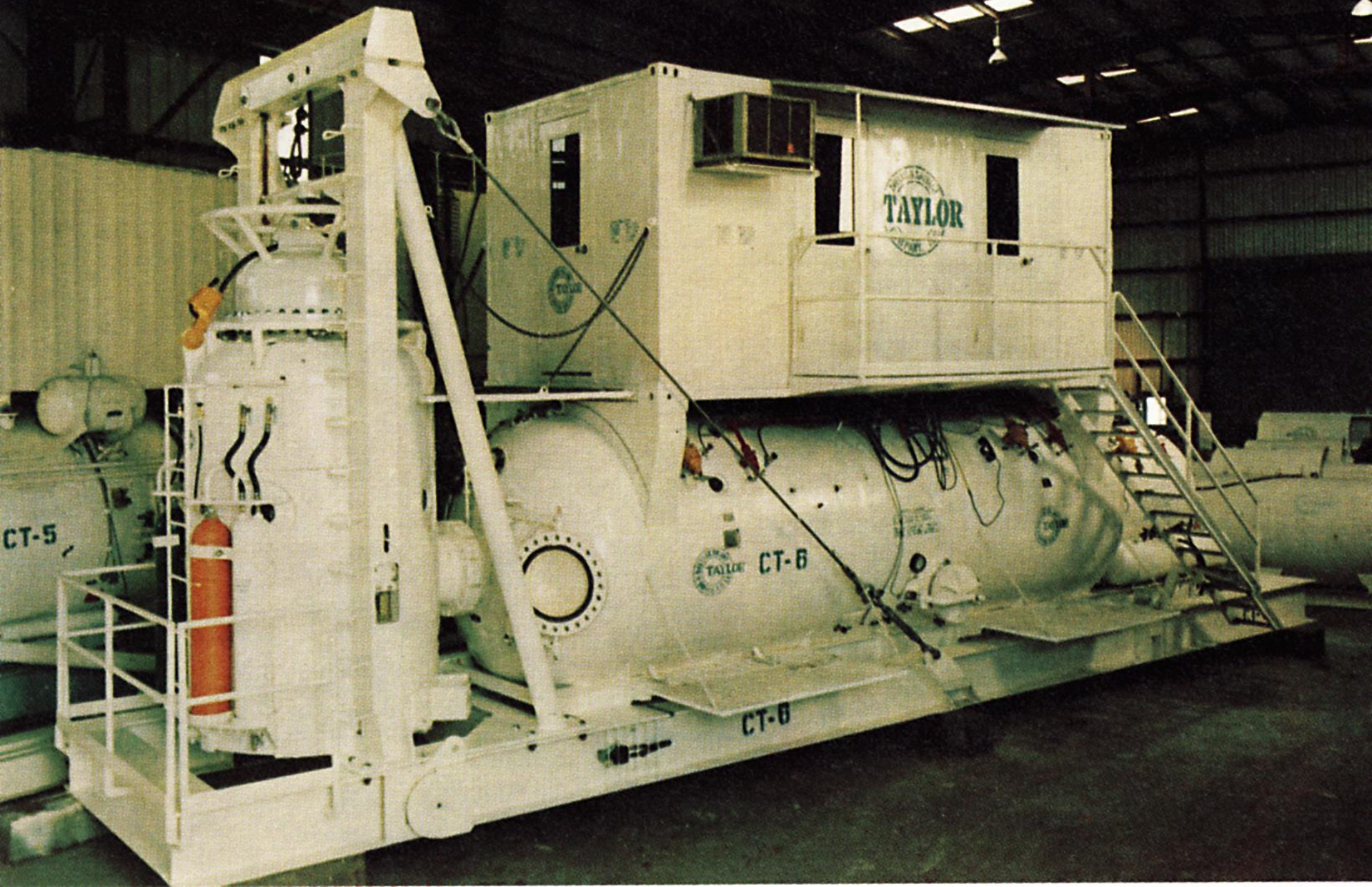
**USN Divers
West Coast Abalone Divers
Cowboys from all over**



**Light Gear
with Band
Mask and
Swindell hat**



7 Person saturation Diving System



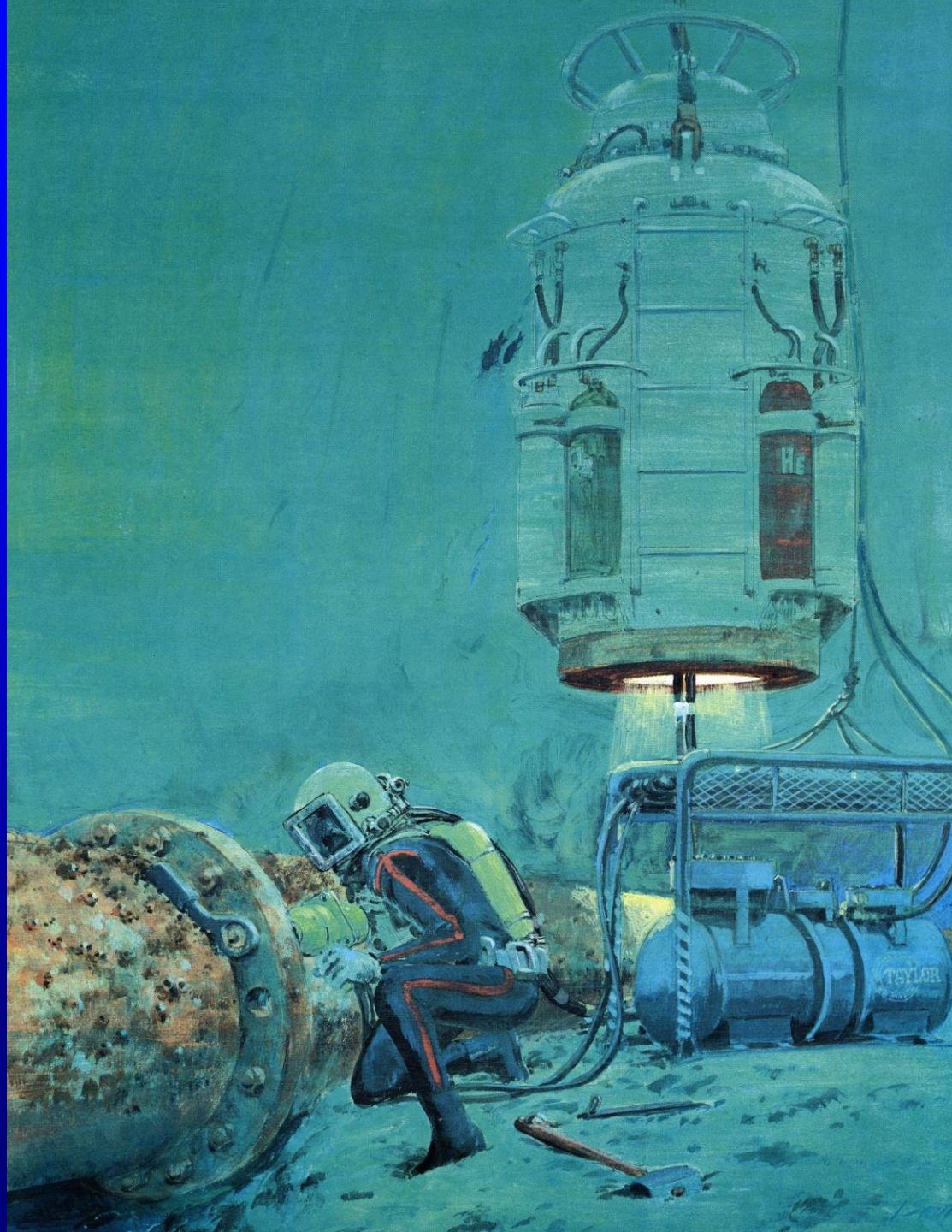
Diver out of bell on
Four hour shift

Bell run normally
Eight hours

2,000' possible

1,700' has been done

1,000' deepest realistic



OceanWorks Atmospheric Diving Suit (ADS)

The best current
example of non-
hyperbaric underwater
intervention.

The secret is in the
pressure balanced
joints.

Note claws and
limited visibility.



The Inevitable Changing of the Guard



The 1990's

ROV Applications Expand

Reliability reaches
a point where the
industry began
to trust the
technology and
design projects
around ROV
capability



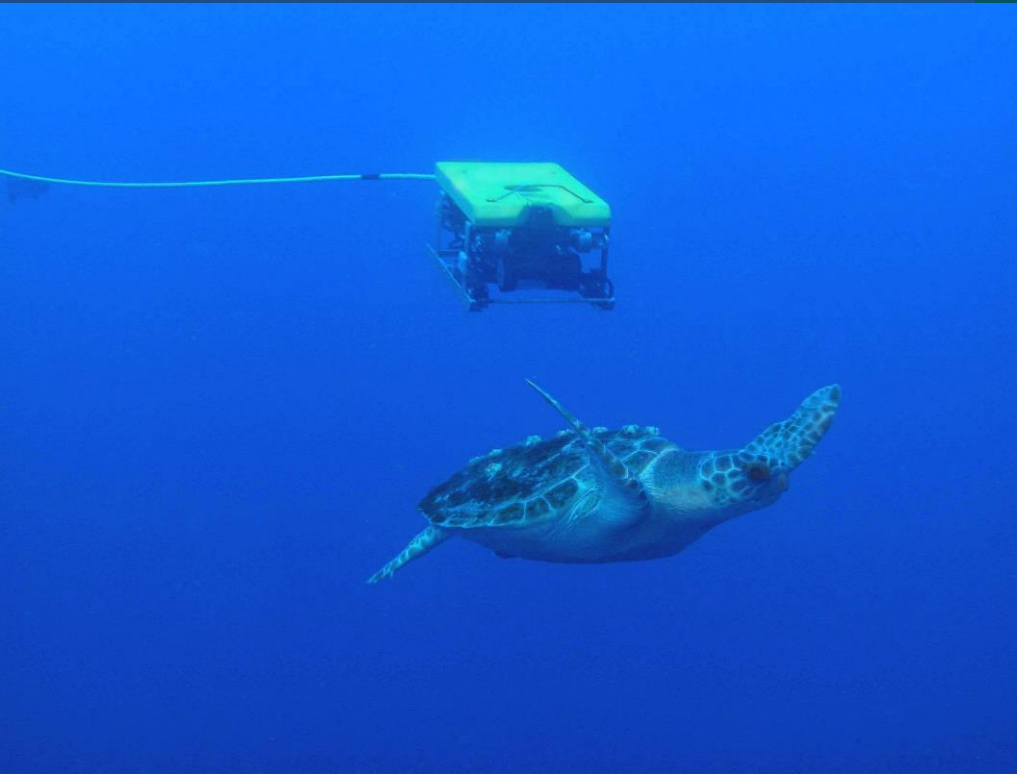
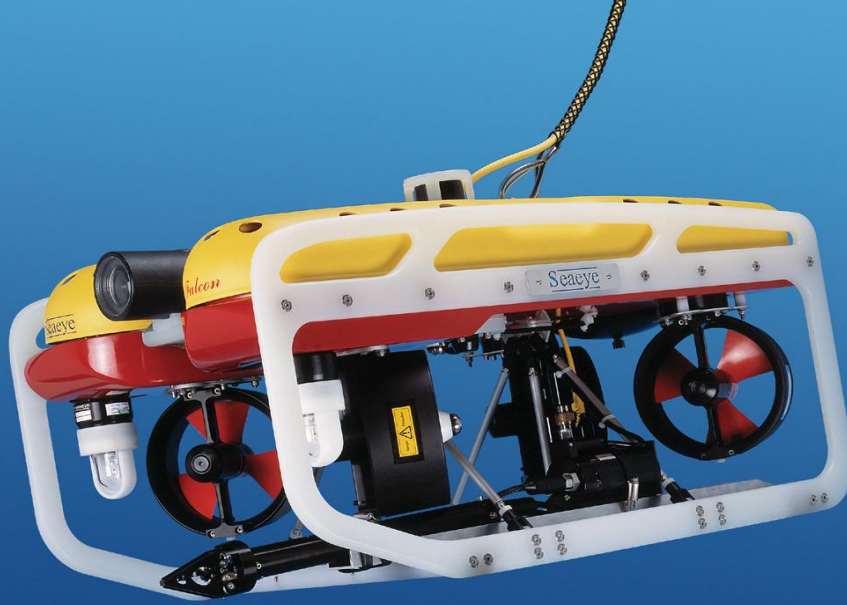
Today Major Projects are Planned Around ROVs



Observation Class Micro



Observation Class Mini





WORK CLASS ROBOTS

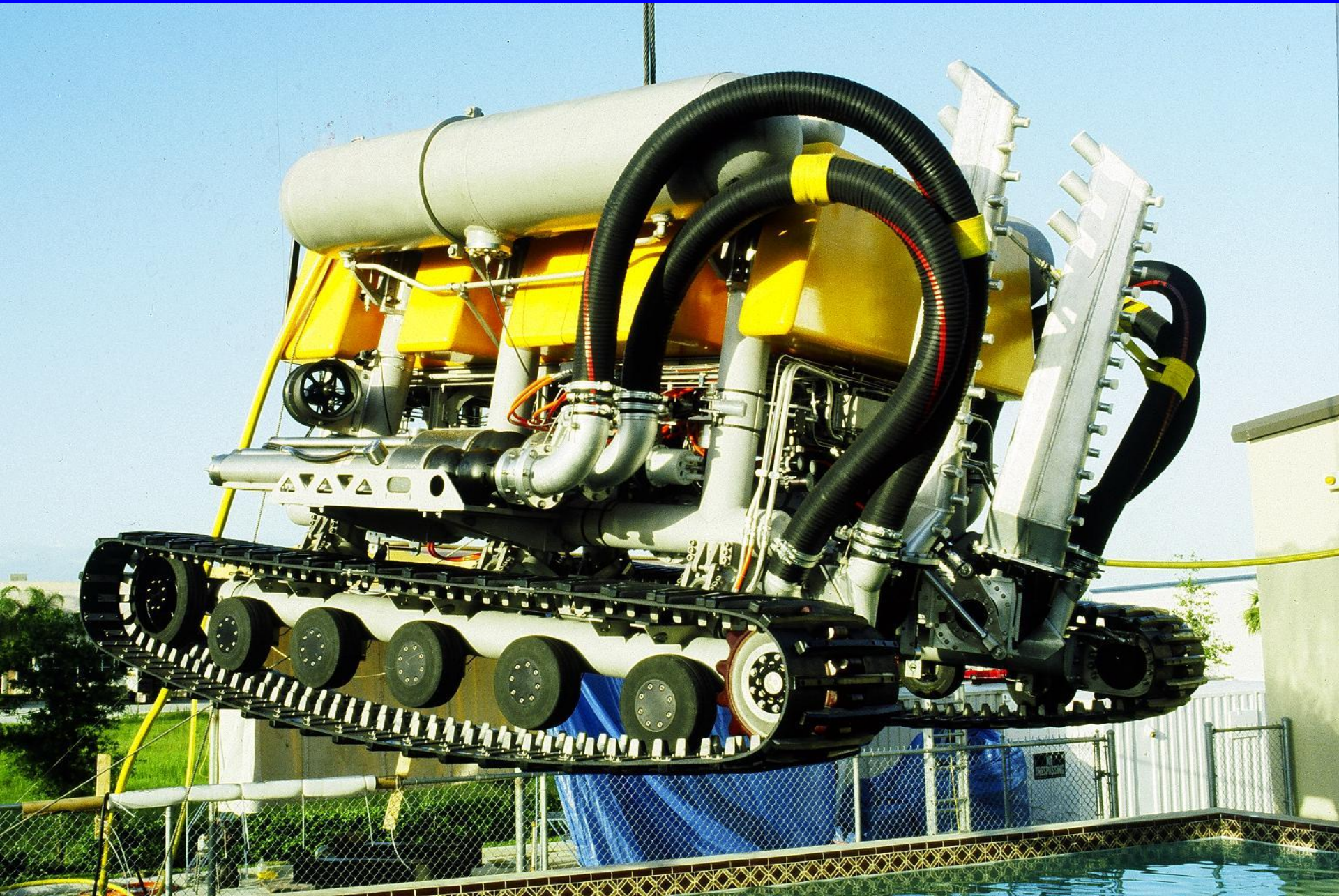


Heavy Work Class

- 225 Horsepower - 2900 pounds of vertical lift
- Multiple heavy tools



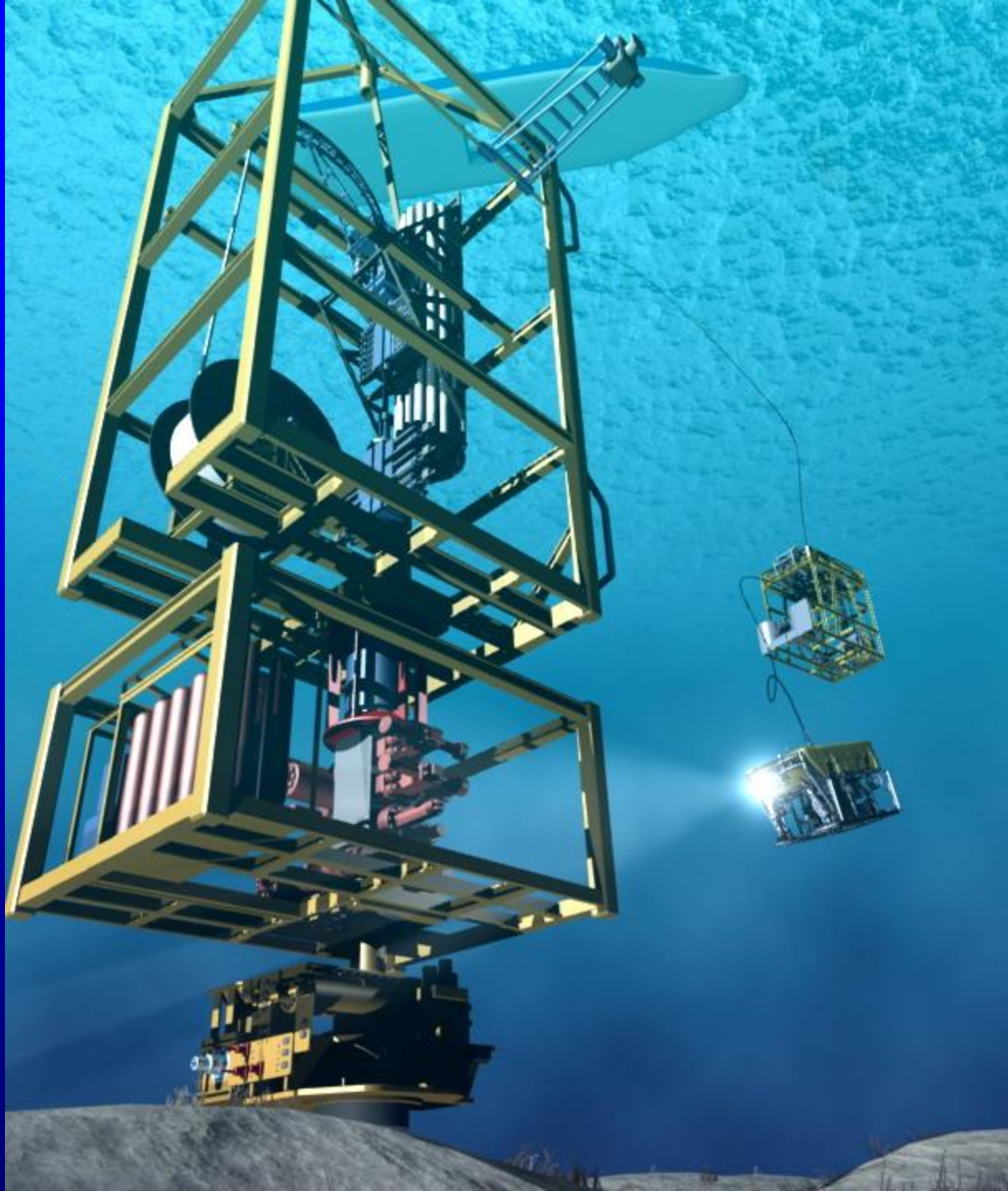
500 Horsepower Cable and Pipeline, Trencher



SIM

250 TONS

**85 FEET
TALL**

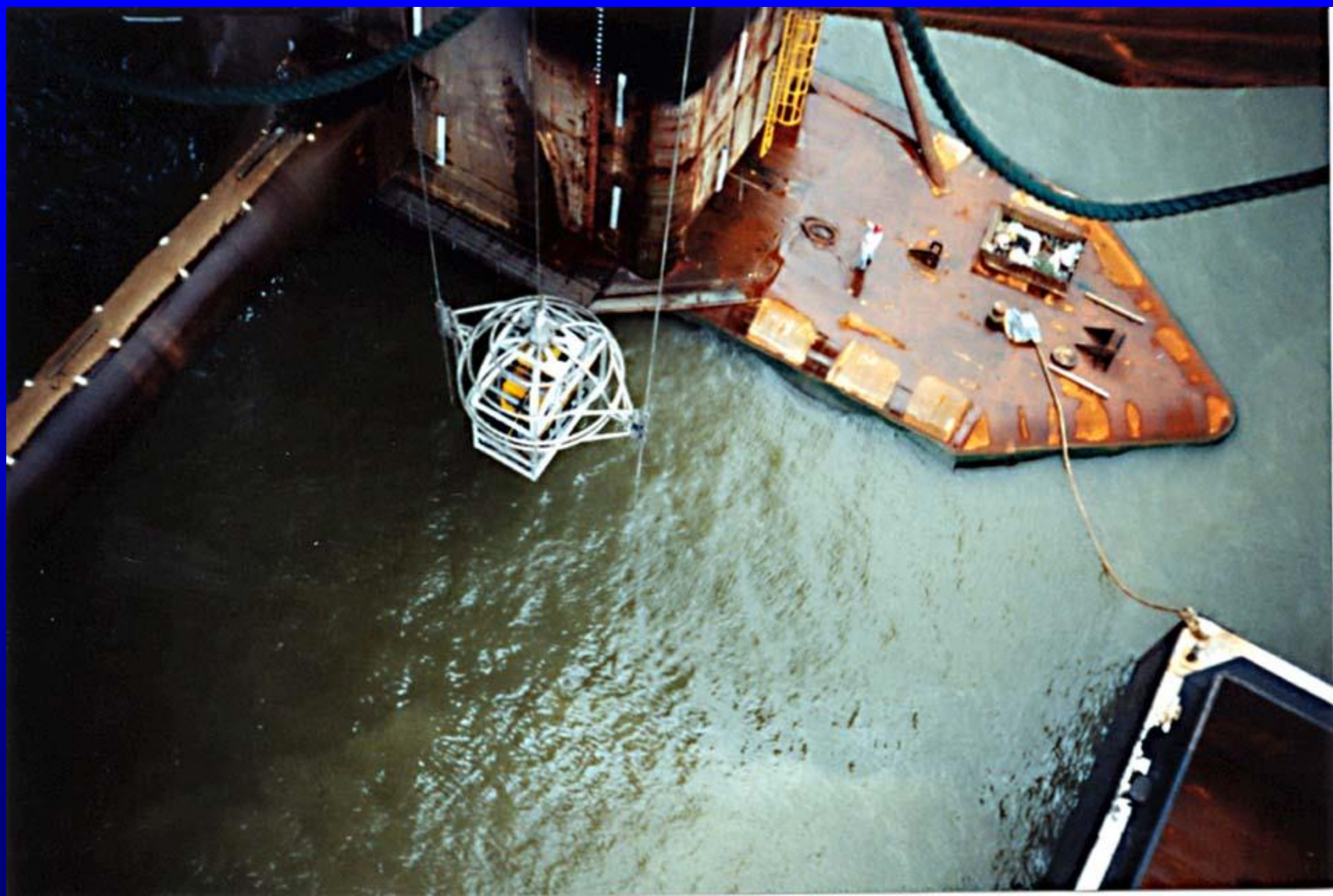




**IT'S NOT ALL FUN
AND GAMES – BUT
IT'S EXCITING**

Typical Cage Systems







Typical Portable
Control Room

**ROV PILOTS
“FLY”
THE VEHICLES**

Shipboard Installation



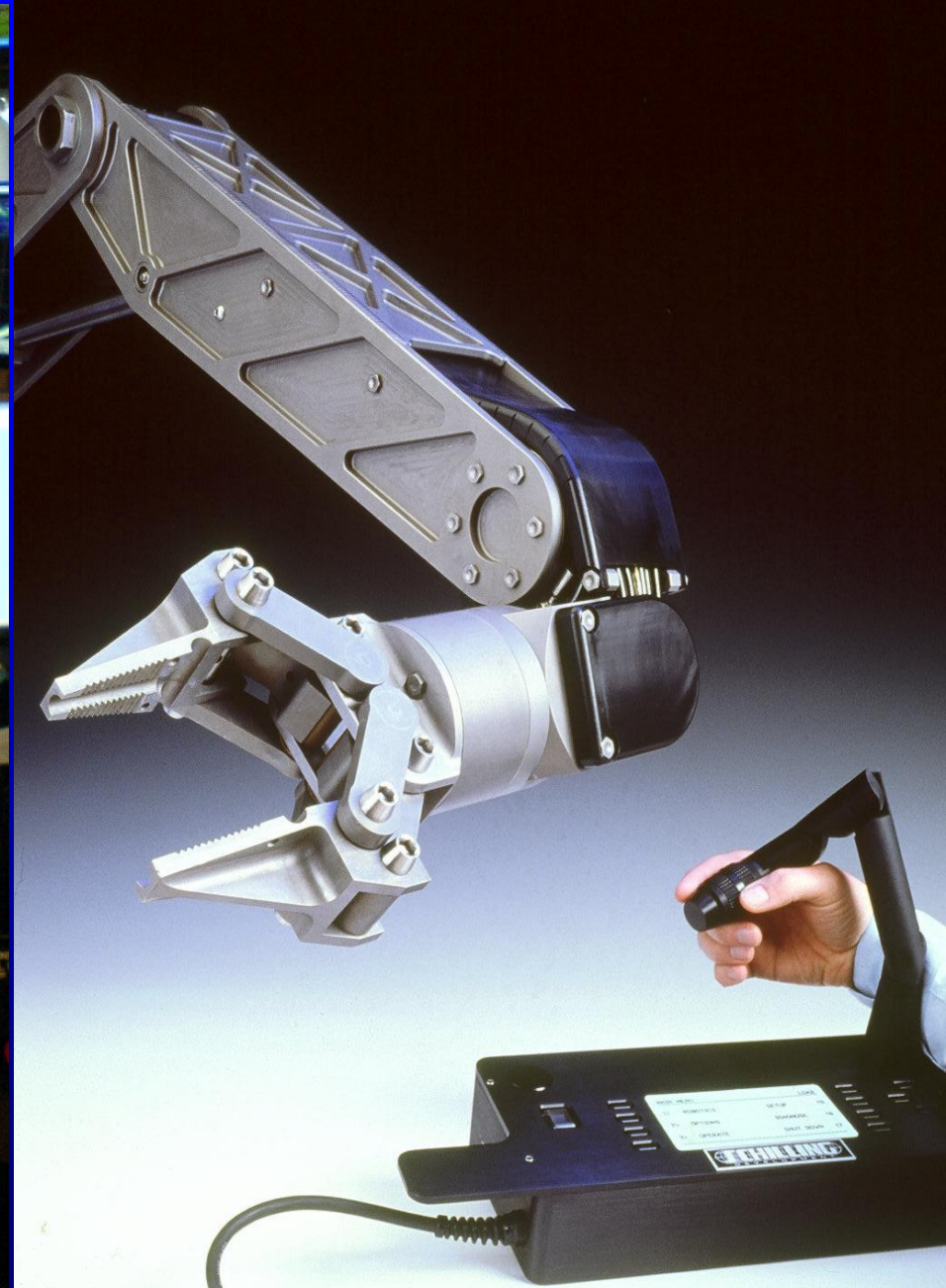
MAYBE YOUR VIDEO GAMES WILL PAY OFF!



SIM System Control Room



ROBOT ARMS



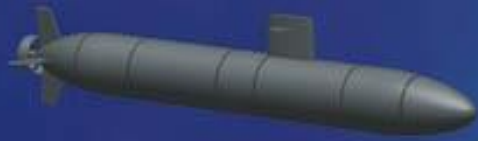
AUTOMONOUS VEHICLES

**THE UNDERWATER
SATELLITES**

NAVY MINE HUNTERS

GPS Position Fix Capability

Torpedo Tube L&R



2 Autonomous UUVs

RF and Acoustic Communications

Single Sortie Reach 75-120 nm

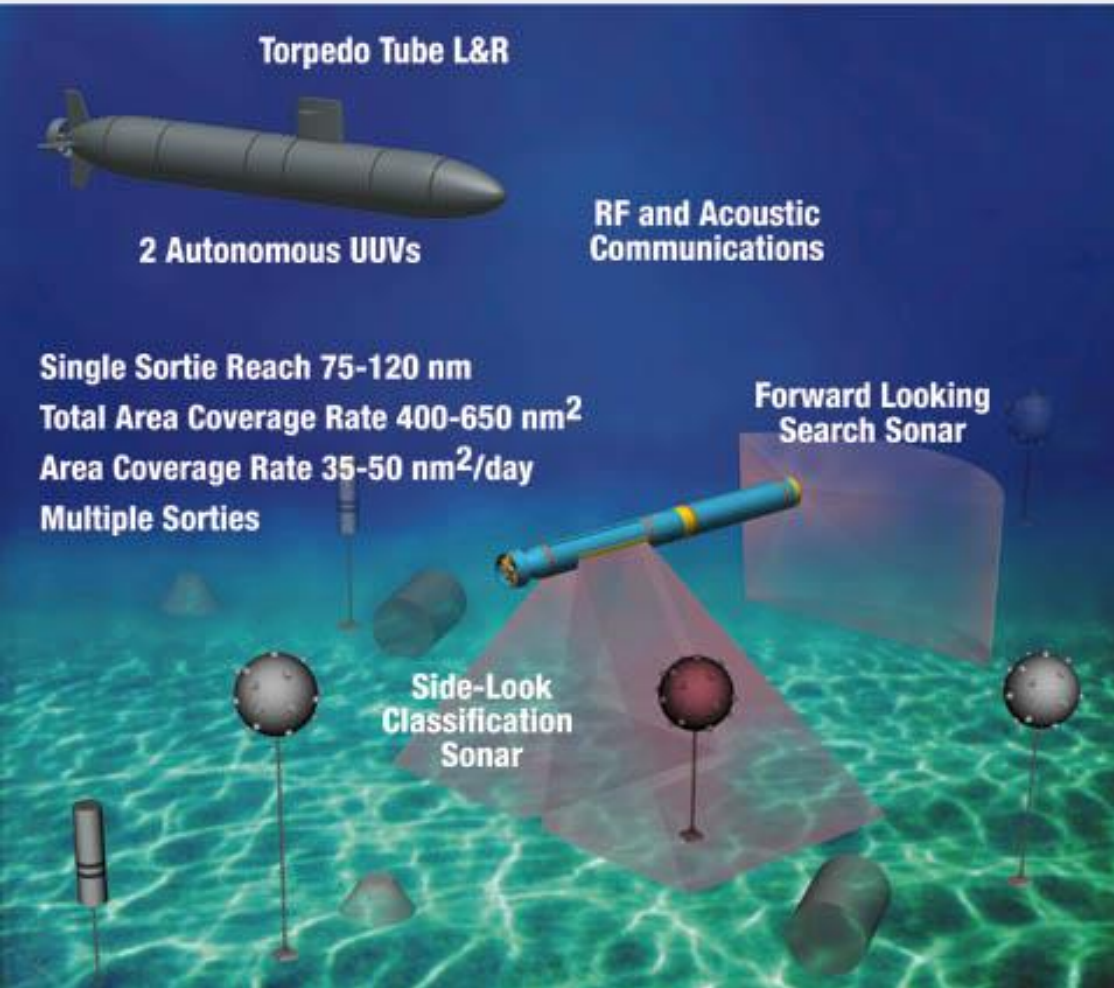
Total Area Coverage Rate 400-650 nm²

Area Coverage Rate 35-50 nm²/day

Multiple Sorties

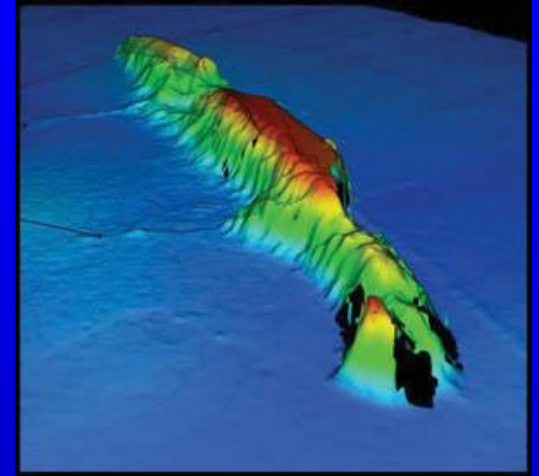
Forward Looking Search Sonar

Side-Look Classification Sonar



AUTONOMOUS VEHICLES

ECA'S ALISTER 3000 AUV



SUBSEA 7'S GEOSUB



ISE'S EXPLORER - CANADA



18.5 FOOT ECHO RANGER



(Courtesy of Boeing)

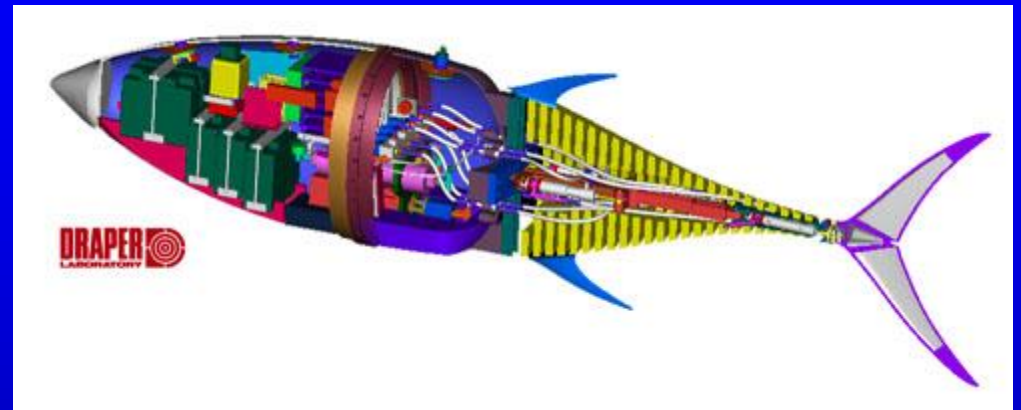
AUTOSUB IS (WAS) WORKING YEAR ROUND



YOU CAN BE PART OF THE FUTURE!



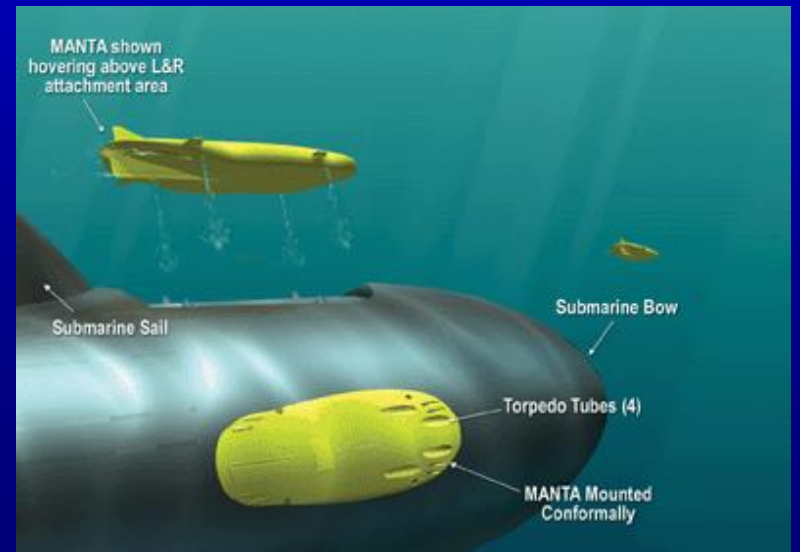
SENTRY



ROBOTUNA



ALUV



MANTA

DOES AN EDUCATION PAY?

WHAT DO YOU THINK?

Education Pays – 20 / 40 Years

		20 YRS	40 YRS
• HIGH SCHOOL DROPOUT	= 22 x \$18.7K/yr	= \$411K	\$785K
• HIGH SCHOOL GRAD	= 20 x \$27.9K/yr	= \$558K	\$1,116K
• 2 YEAR AA DEGREE	= 18 x \$35.9K/yr	= \$646K	\$1,364K
• 4 YEAR BA DEGREE	= 16 x \$51.2K/yr	= \$819K	\$1,843K
• 5 YEAR MS DEGREE	= 15 x \$62.2K/yr	= \$933K	\$2,177K
• 7 YEAR PHD DEGREE	= 13 x \$88.5/yr	= \$1,150K	\$2,920K

*Above does not account for inflation, interest or college expenses. Based on national average, thus, actual numbers could be increased by \$1M+ with investments

OR...DO YOU WANT TO MAKE A MILLION DOLLARS

	40 YRS
• HIGH SCHOOL DROPOUT	= \$0.00
• HIGH SCHOOL GRAD	= \$331,000
• 2 YEAR AA DEGREE	= \$579,000
• 4 YEAR BA DEGREE	= \$1,058,000
• 5 YEAR MS DEGREE	= \$1,392,000
• 7 YEAR PHD DEGREE	= \$2,135,000

*Above does not account for inflation, interest or college expenses. Based on national average, thus, actual numbers could be increased by \$1M+ with investments

**IS IT WORTH TAKING
ENGLISH?**

DOES ENGLISH PAYOFF?

YES!!!!!!!!!!!!



THERE ARE A LOT OF WAYS TO GET STARTED



THANK YOU

For more information

- Marine Technology Society (MTS) ROV Committee
<http://rov.org>
- MTS San Diego Section www.mts-sandiego.org
- Marine Advanced Technology Education (MATE) Center www.marinetech.org
- Santa Barbara City College Marine Diving Technology
www.sbccc.edu/marinediving



Thanks to Drew Michel of the MTS ROV Committee for providing material for this presentation

