

# AUTONOMOUS UNDERWATER VEHICLES FOR HARBOR PROTECTION

## SWARM TECHNOLOGY:

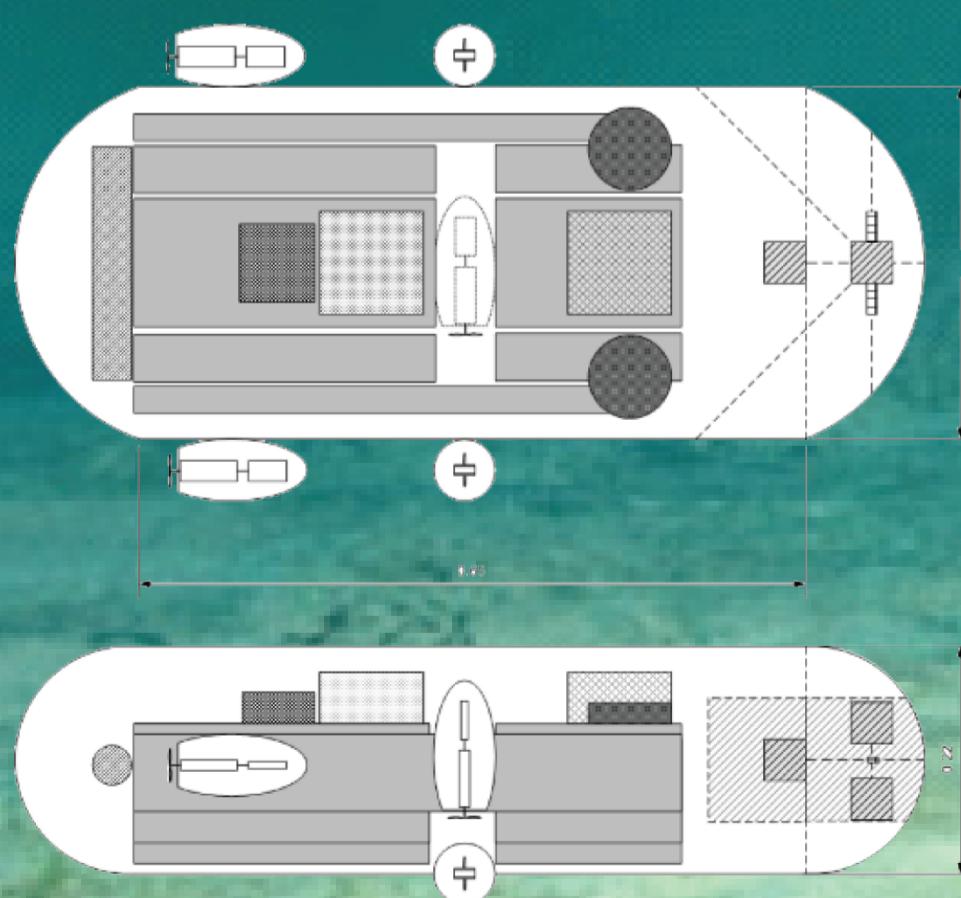
- SIMPLE AUV's COMBINE TO CREATE COMPLEX, INTELLIGENT SYSTEMS
- LEADER AGENTS AND NORMAL AGENTS

## COMMUNICATION:

- NETWORKED
- ACOUSTIC WITH SPREAD SPECTRUM
- DATA RATE OF 5 KBYTE/S

## SONAR:

- FAN-SHAPED SINGLE BEAM SONAR
- 180° ROTATION
- HIGH RESOLUTION UP TO 50 M
- SWATH WIDTH 1° BY 22°
- FREQUENCY RANGE OF 660 TO 1000 KHz



## MODULAR BUILD-UP

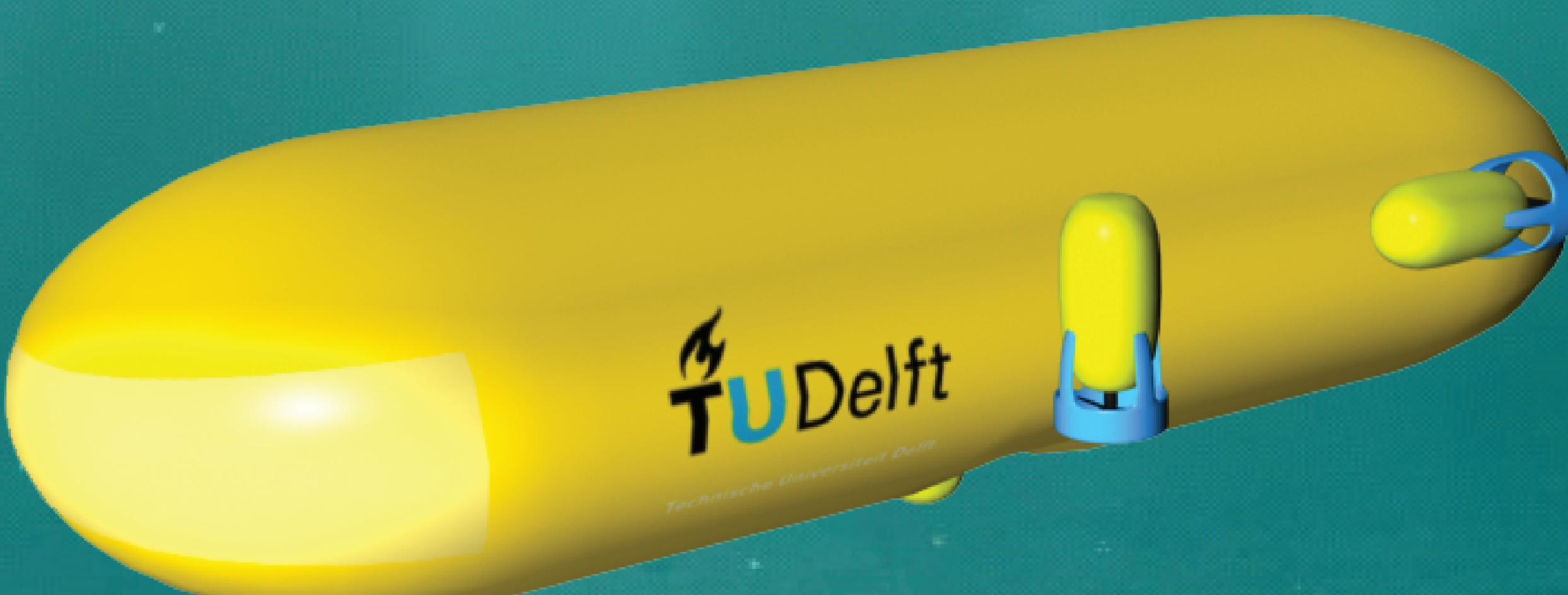
- HIGHLY ADAPTABLE
- EASILY INTERCHANGABLE SENSOR PACKAGE
- COMPATIBLE WITH FUTURE DEVELOPMENTS

## TOP LEVEL REQUIREMENTS:

- DETECT, LOCALIZE, AND CLASSIFY THREATS
- USING OFF-THE-SHELF COMPONENTS
- BUDGET OF €200,000 FOR 100 AUV'S
- OPERATION TIME OF 2-5 DAYS
- SUSTAINABLE

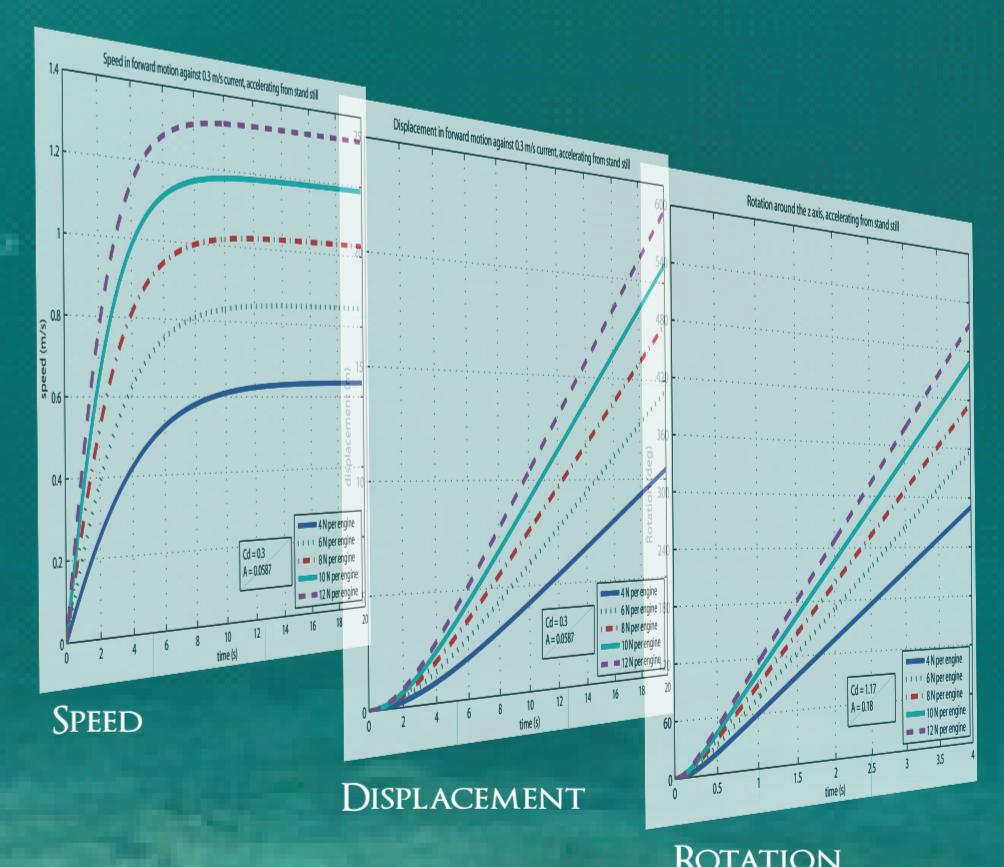
## POSITION DETERMINATION:

- ULTRA SHORT BASELINE SYSTEM
- D-GPS
- ACCURACY < 1M



## PROPELLION:

- FIVE FIXED THRUSTERS
- REACH SPEEDS UP TO 1.3 M/S
- ROTATE 180° IN 1.6 S
- FIGHTS A CURRENT OF 0.3 M/S IN ALL DIRECTIONS
- HOVERS IN 3D



## THREAT DETECTION TIMELINE

