Employing Advanced Wave-Sensing Doppler-Radar, FutureWaves provides:

- Optimal course and speed recommendations based on in situ wave analysis
- Deterministic forecasting of precise vessel motions
- Detailed timing of waves – before they occur
- Real-time detailed sea-state characterization
- Automatic/self-calibration
- Data trends and archiving

How it works:

- Specialized Doppler wave-radar measures wave field velocities
- Numerous individual wave components, which detail the wave field, are calculated based on the directional energy and period spectra
- Using these wave components, incident wave height and timing are determined, even along a projected vessel track
- Vessel motions (e.g. heave, roll, pitch) are computed by adaptive modeling techniques that mitigate real-world inaccuracies and continually refine the motion model

**Proven Real-Time Deterministic Forecasting**

**REDUCE RISK**
Obtain detailed knowledge of current ocean conditions – Keep your team and your assets safe.

**INCREASE EFFICIENCY**
Maintain confidence during critical operations – Know when ocean conditions will interfere.

**REDUCE COSTS**
Expand workability and operational windows – Stop sitting idle waiting on the environment.

**Know Your Ocean**
Developed by Applied Physical Sciences Corp. of Groton, CT for the US Navy and Marine Corps to support seabasing operations in limiting conditions, FutureWaves can benefit numerous applications, such as asset launch & recovery, crane operations, and feed-forward systems.

• Most wave radar systems determine oceanic wave characteristics by processing the reflected power signal
  ⇒ This signal is directly related to surface roughness
  ⇒ As wind speed changes the roughness changes and this affects the computed wave characteristics
  ⇒ Ocean wave timing measurements are inaccurate when processing the reflected power signal

• FutureWaves overcomes these limitations by processing the Doppler-shift of the reflected signal which directly measures wave-orbital-velocities at the ocean surface
  ⇒ The Doppler-shift is not affected by wind speed
  ⇒ Wave period, direction, and height are matched to the measured ocean-surface velocities
  ⇒ The result is a calibrated, complete ocean wave field measurement including futuretiming of incident waves and resulting ship motions

• The technique requires a specialized radar at the heart of the FutureWaves system

Detailed sea-state information through measurement of wave orbital-velocities
- Remotely sensed
- No buoy needed
- Automatic/Self-Calibration

FutureWaves Wave Sensing Radar

For more information, visit FutureWaves.aphysci.com or email FutureWaves@aphysci.com

Applied Physical Sciences Corp. is a wholly-owned subsidiary of General Dynamics Corporation.