

## At a Glance

### What is it?

- The goal of the Direct Attack Seeker Head (DASH) FNC is to provide an adverse-weather, moving target capability to weapons with a low-cost, dual mode seeker. The DASH seeker intends to add this needed capability to an upgraded Tactical Tomahawk. The modular approach can also potentially support a variety of weapons types such as Zuni rockets, JDAM, etc.

### How does it work?

- DASH will combine Millimeter Wave radar with an Imaging Infrared seeker to provide terminal phase guidance to a weapon. DASH will combine all available sensor, navigation, and data-link information into a high quality target solution for use in the weapon target tracker. Using template matching it will correctly confirm the target it was launched against, and establish and maintain track, despite adverse weather conditions.

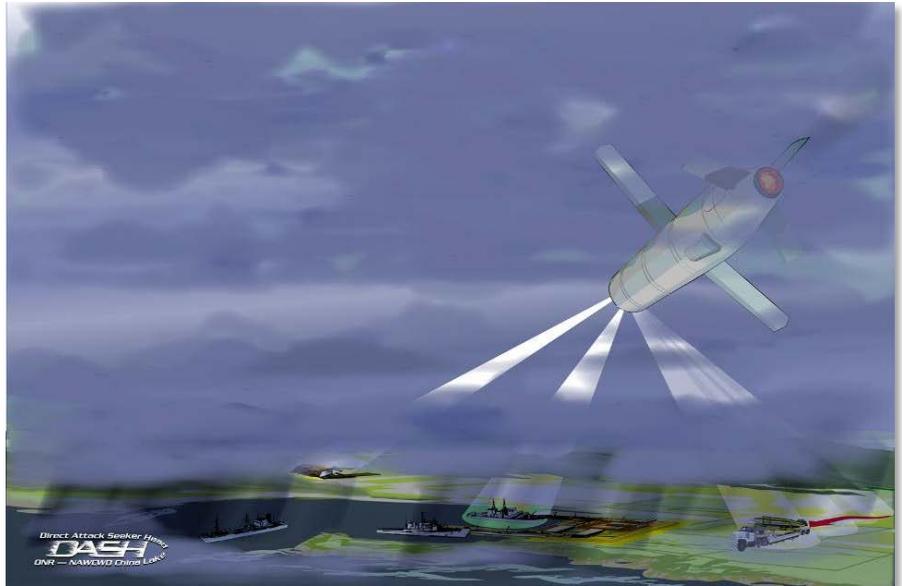
### What will it accomplish?

- Low-cost DASH technology, when coupled with other proposed upgrades, will enable Tomahawk to attack moving and/or relocatable targets in a maritime environment. The mmW radar will facilitate target acquisition in adverse weather and the IIR sensor will enable critical, precise aimpoint selection in the engagement endgame.

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The Direct Attack Seeker Head (DASH) Future Naval Capability (FNC) Product is a low-cost, Imaging Infrared/Millimeter Wave (IIR/mmW) seeker designed to provide terminal guidance to a weapon used against moving or re-locatable (and stationary) targets in adverse weather and varied environments. The key to locating a moving target in adverse weather is the active radar seeker. The IIR seeker comes into play as range closes, providing good angular position to supplement the range information from the radar seeker. The IIR can also refine an aimpoint on the target. Both modes have the ability to support confirmation that the target designated prior to launch is the target being engaged.

The radar was developed with an anticipated low production cost as one of its metrics and the IIR was planned to utilize low-cost, off-the-shelf cameras that rely on uncooled focal plane arrays. The Core Processor has been custom designed for developmental purposes with a complex arrangement of multiple Field-Programmable Gate Arrays and Digital Signal Processors to provide a desired over-capacity. Existing software has been adapted to solve the "single class" classification problem. This is a simple target confirmation approach that keeps seeker cost low.

DASH's modular design approach to system requirements is compatible with the Tomahawk cruise missile and other weapon systems. The dual mode/dual aperture approach provides flexibility in the integration of the seeker. The modular design allows other weapon systems to pull those pieces that are most useful for their applications. For example, the 5-inch diameter radar has cross weapon compatibility, form fit to a MK 80 series fuze-well or suitable for a 5-inch Zuni rocket. The DASH core processor hardware and software design is scalable, providing expansion for additional sensors, as may be needed for a mission customized weapon design solution.

### Research Challenges and Opportunities:

- Low-cost radar and IIR seeker components
- Light weight processors with low electrical power demand and rapid data processing capability
- Advanced data fusion algorithms

