

IDAS

Interactive Defence and Attack System for Submarines



**An example
for German-Norwegian
Defence Industry Cooperation**

Copyright IDAS Consortium



Agenda

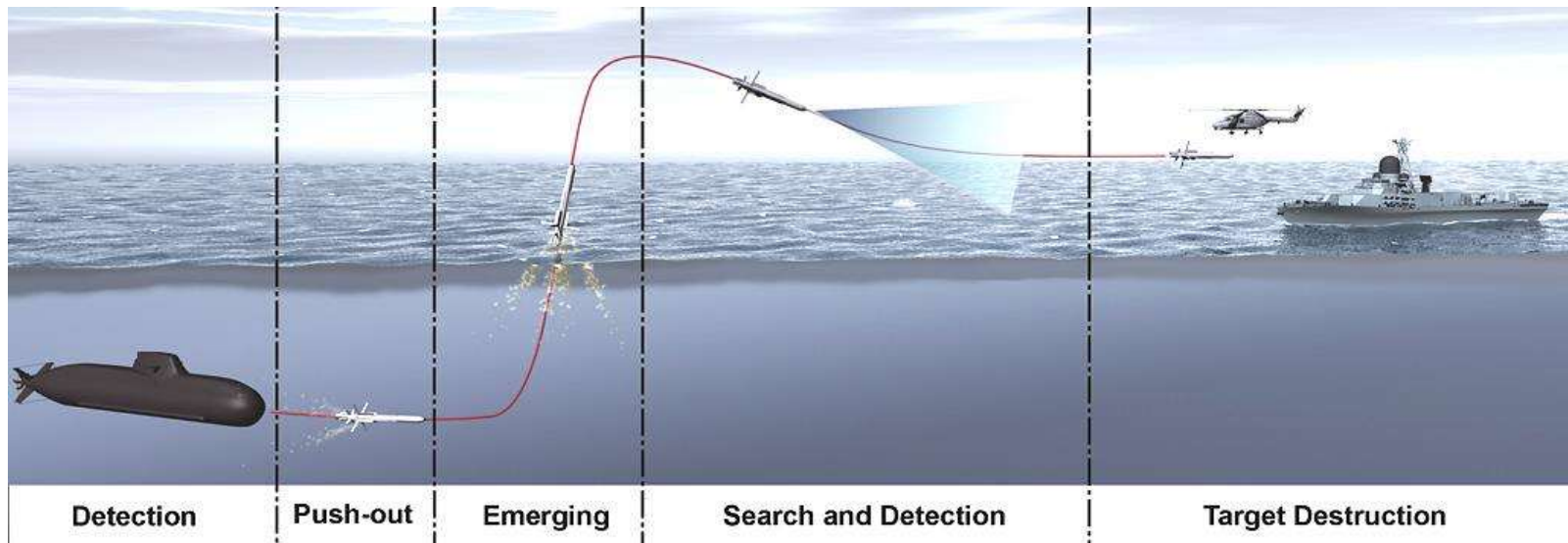


- 1. IDAS – an overview**
- 2. History – the experimental studies**
- 3. The industrial development program**
- 4. IDAS roadmap**

IDAS – Changing the paradigms of ASW



- Active self defence against ASW helicopters for submerged submarines.
- Coastal and small surface targets attack capability
- Deployment from submerged submarines (multiple periscope depth, without using hoistable equipment).
- Autonomous guidance, operator control until end of mission (Human in the loop).
- Minimal modifications to the submarine, easy integration possible (stand-alone).
- Launched out of standard torpedo tube (4 missiles per tube).
- Range approx. 20km.



The IDAS Target Spectrum

Defensive Role



Offensive Role

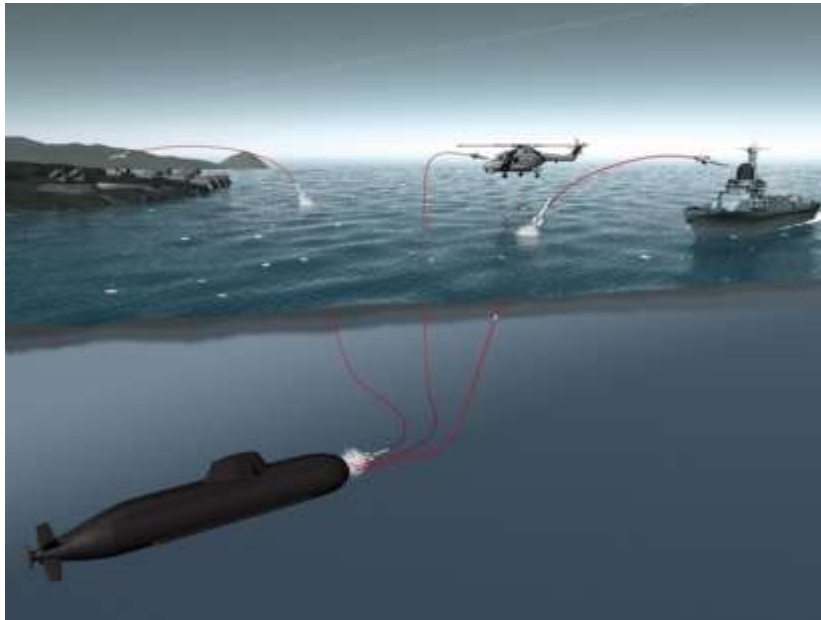
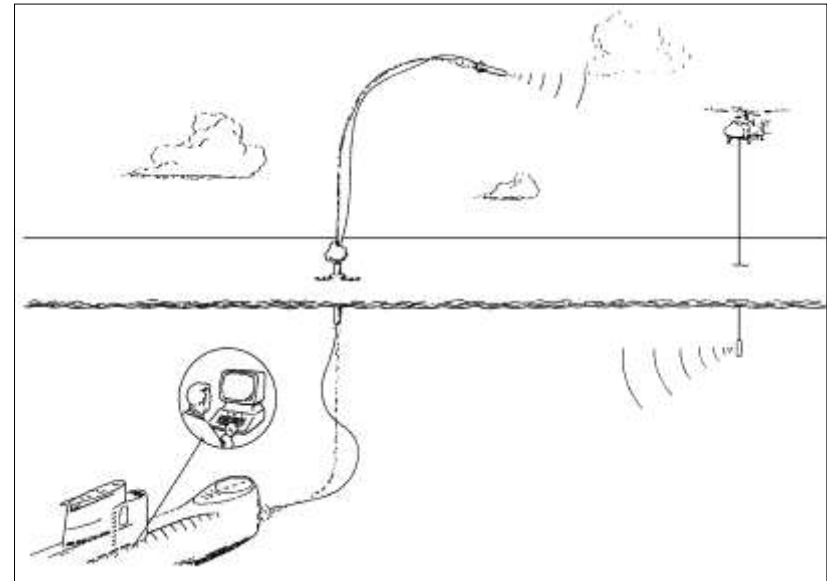


Weapon for targets which are too fast or not accessible for a heavy weight torpedo, or for which a torpedo is over-dimensioned

History of experimental studies

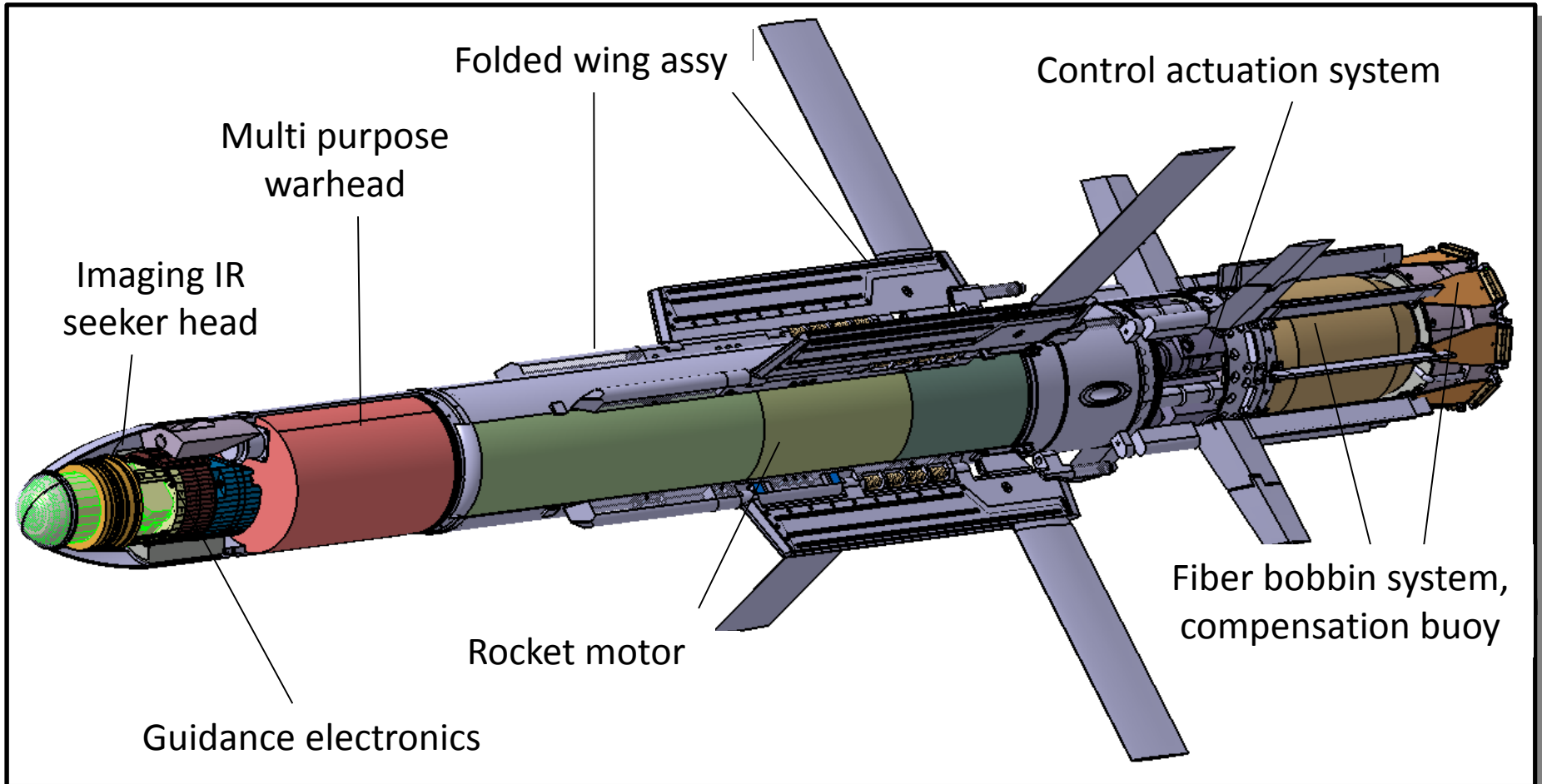


- 1995 Start of Project of a sub-launched self defence missile
- 1996 Preparation of an experimental study
- 1997 **Kongsberg** joins the program
- 1998 Start of experimental study
- 2001 Termination of experimental study
Exit of EADS/LFK



- 2001 BGT (Today: Diehl BGT Defence) joins the program
- 2002 Concept study IDAS, new missile concept
- 2003 Start of three phases experimental study
Nammo joins the program
- 2006 Firing tests Elpersbüttel
- 2008 Firing Test from submarine U 212A
- 2010 Start of the industrial development program IDP

Experimental study missile configuration



Experimental study: Contribution of KDA



1998: KDA participates in the BWB-financed experimental study on „Missile employment from a submarine against ASW helicopters“.

KDA work share:

- Integration into the CMS (Kongsberg MSI-90U) of the submarine class 212A for Germany and Italy
- Export version of this IDAS integration
- Export version of an IDAS stand-alone console

2004: KDA becomes member of the ARGE IDAS and participates in the IDAS experimental study phases 1 to 3

2012: After completion of the government funded experimental phase, KDA decides, not to become a member in the IDAS Consortium and not to participate in the IDAS Industrial Development Program.

KDA remains welcome as a partner of the IDAS Consortium.

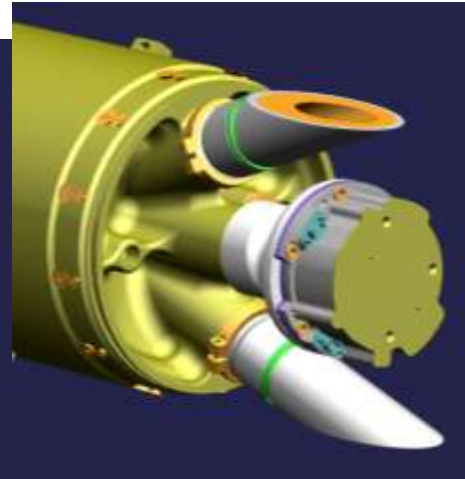
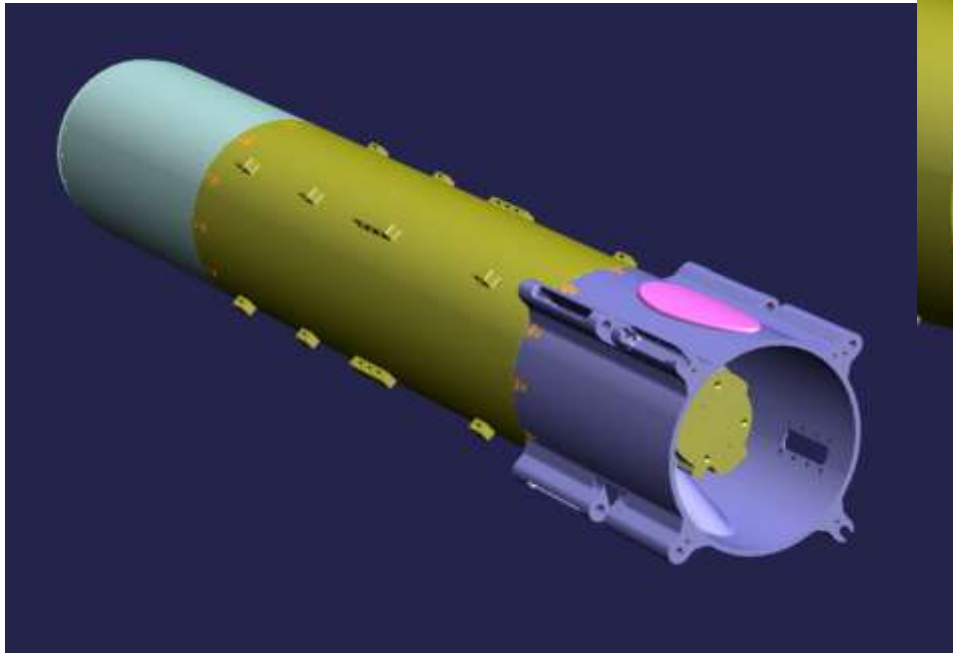
CMS / Stand-alone conole



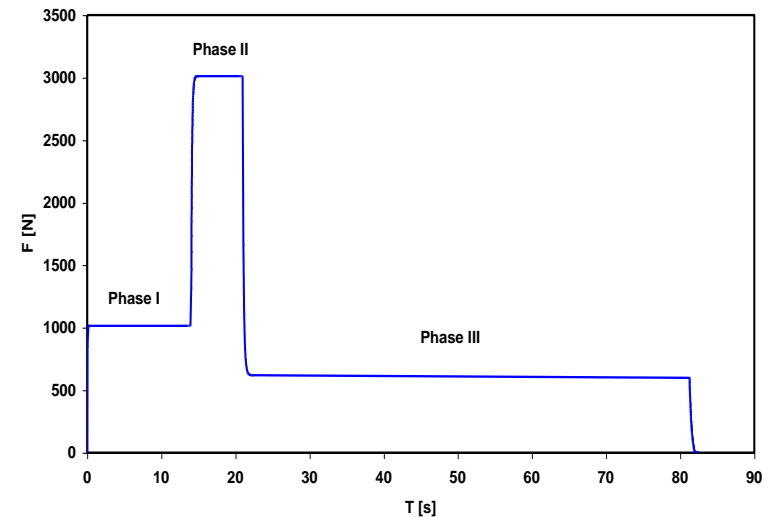
KONGSBERG
DEFENCE & AEROSPACE



Experimental study: Nammo Contribution



- Single-stage rocket motor with three thrust levels
- Steel casing
- 2 angled nozzles
- Reduced smoke composite propellant



Test Firings



Test firing results:

- All tested functions 100% proven
- All goals achieved
- Autopilot worked properly, aero-/ hydrodynamic models proven
- Communication submarine to missile proven before and after launch.



IDAS Achievements

- Navigation system alignment submarine - missile
 - Safe separation from the submarine torpedo tube
 - Ignition of rocket motor, unfolding of wings/fins under water
 - Fiber optical data link under water and in the air
 - Transition between the media, maintaining uninterrupted link
- **All IDAS specific critical points have been proven in flight tests – we fired a fiber optical missile out of the torpedo tube of a submerged submarine into a controlled airborne flight state.**



- Due to reorganization of the German Bundeweher and financial shortages the requirements documents were put on halt.
- Although the documented capability gap remained recognized, no further funds were made available by the German public purchaser after 2010.
- Formally IDAS was no longer a project – the “ARGE IDAS” was terminated due to lack of purpose.
- German Industry (ThyssenKrupp Marine Systems – HDW and Diehl BGT Defence – DBD) considered IDAS to be technologically and economically promising enough to continue the project with industry funding in the framework of an “Industrial development Program” IDP.
- For this purpose, the IDAS Consortium was founded.
- Nammo decided, to participate in the IDP effort – with a significant company funding contribution – as a partner, not as a member of the IDAS Consortium.

The IDAS Consortium



DIEHL
BGT Defence

- IDAS Missile
- FO-System
- Missile Control System

Further Partners:

Nammo

 **roket**san

ThyssenKrupp Marine Systems



ThyssenKrupp

- Missile integration
- Launching Container System
- Speaker of consortium



Objective of the industry-funded „Industrial Development Program“

**Develop the IDAS Guided Missile System
as a verified product**

which can be offered to customers.

Qualification will be conducted after Germany and international customers
have established an “IDAS Club of Navies” e.g. by an MoU.

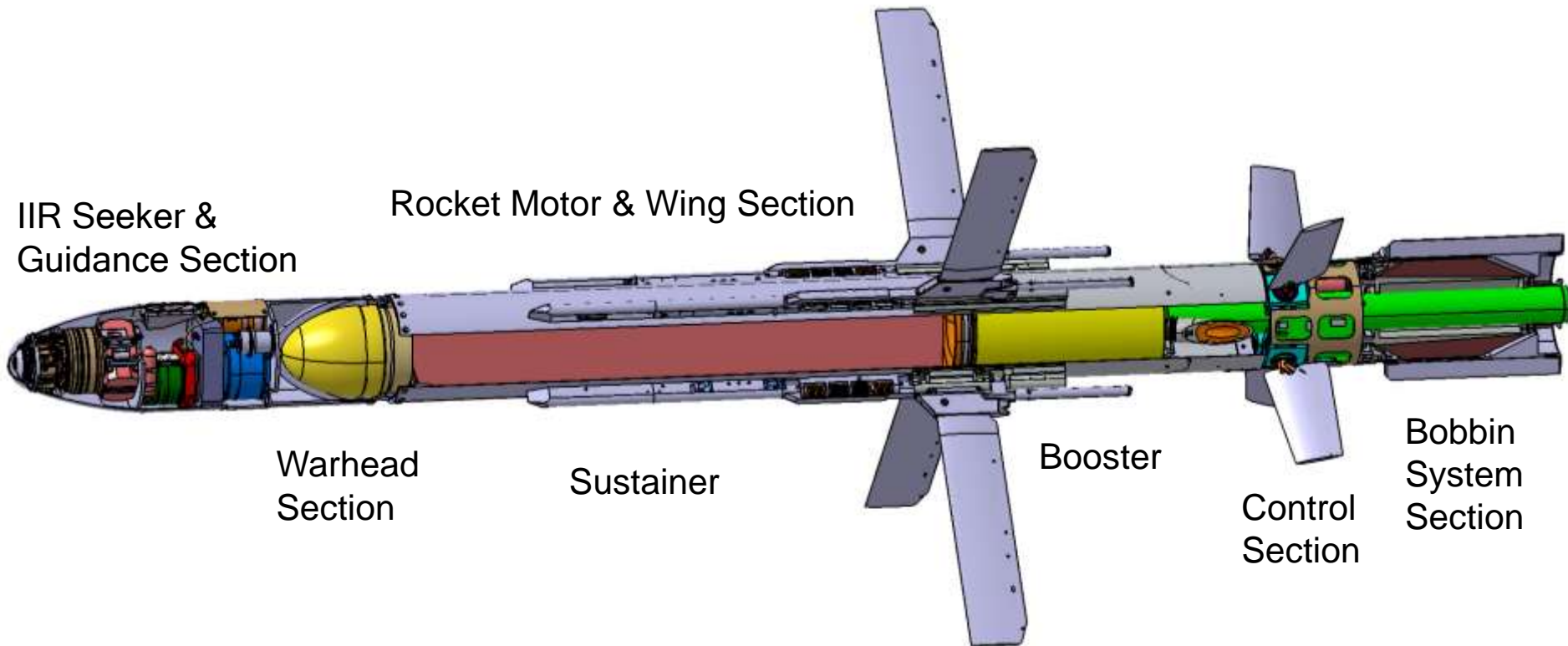


IDAS Submarine Integration

- Four (4) missiles per launching container
- All launching subsystems in container (autonomy)
- Weight/ dimensions comparable to heavy weight torpedo, easy retrofit to all standard torpedo tubes
- Very easy integration, handling with existing equipment for standard heavy weight torpedoes

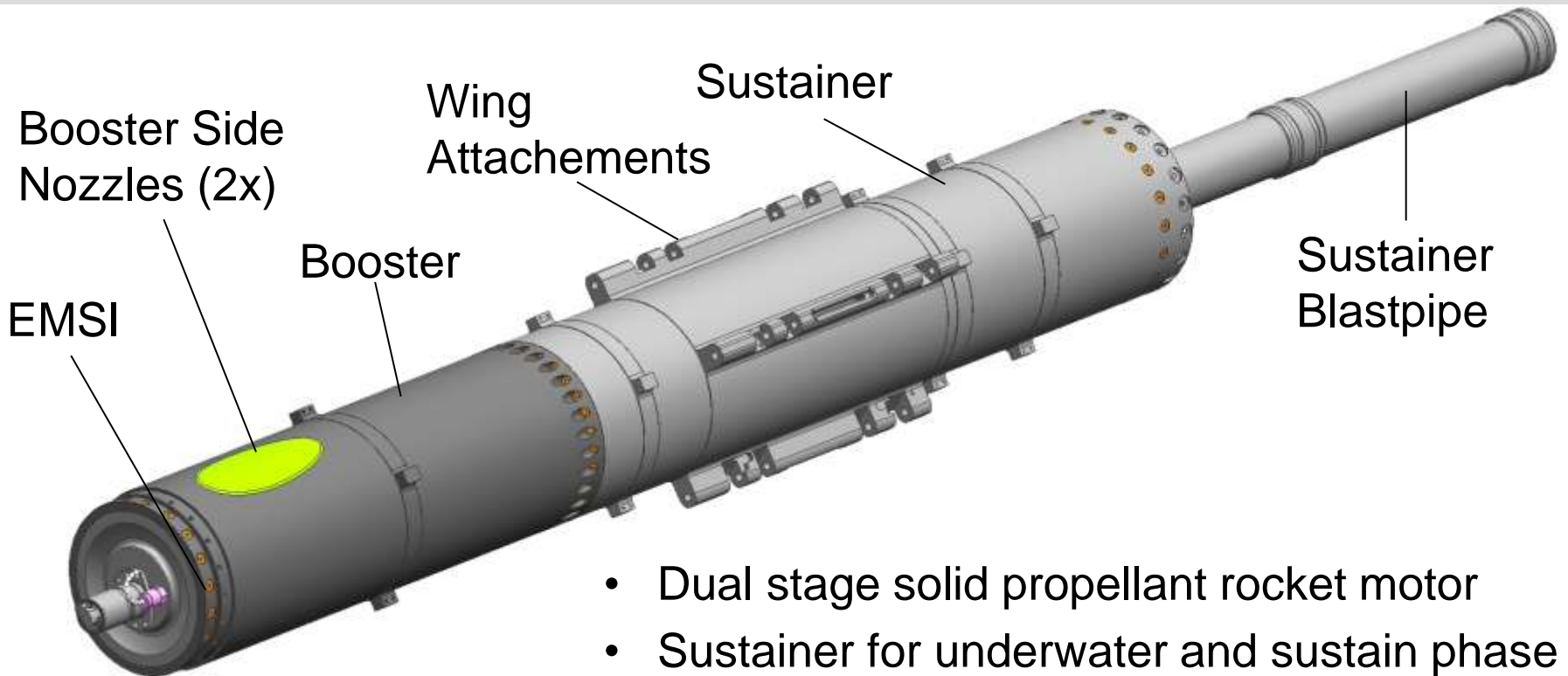


New Missile Configuration



Redesign of missile configuration

- No compensation buoy needed as result of tests
- More efficient central nozzle for rocket motor possible
- Dual stage motor with two thrust levels



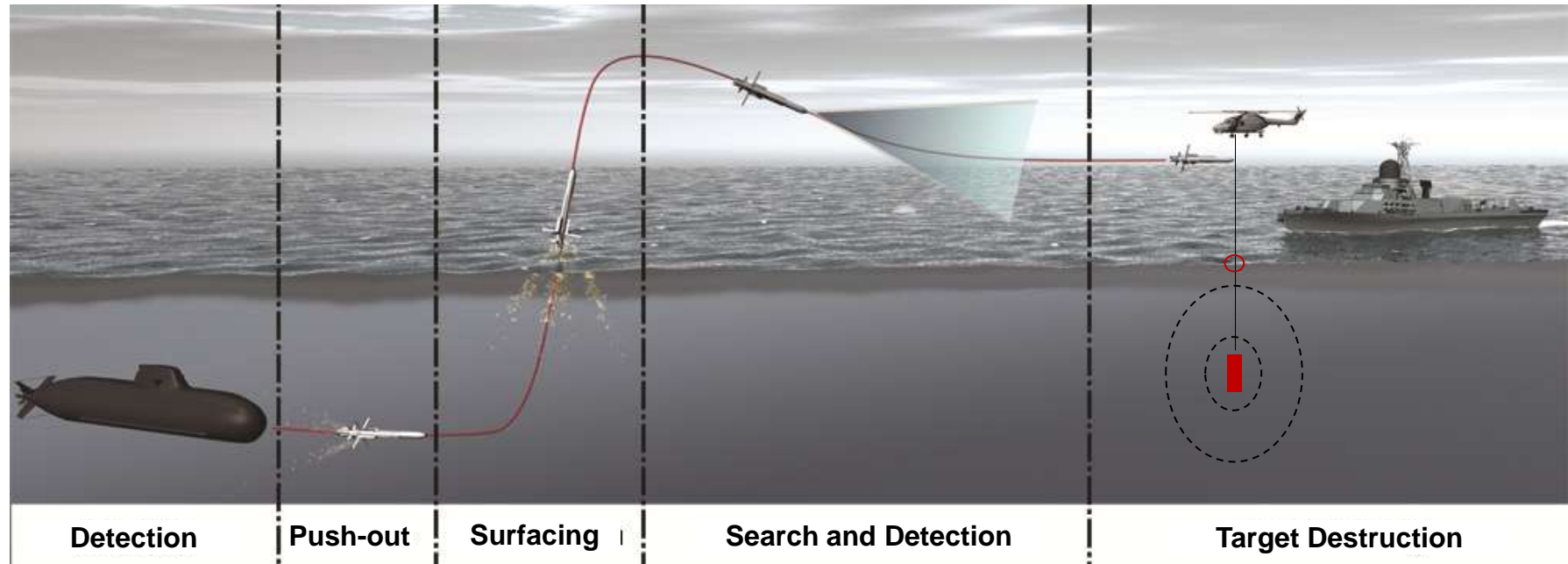
- Dual stage solid propellant rocket motor
- Sustainer for underwater and sustain phase
- Booster for acceleration during/after breaking the water surface



IDAS Achievements - to come until 2015 as result of IDP

- Integration of complete missiles, including seeker, GPS receiver, two stage rocket motor, 20 km fiber optical bobbin system and actuation system
- Proof of the entire functional chain:
 - target acquisition by submarine's sonar system
 - target assignment to the missile
 - Expulsion and underwater flight, including unfolding of fins/wings
 - Breaking surface and heading towards the target
 - Target search supported by the human operator
 - Target acquisition by the seeker, autonomous or human-in-the-loop
 - impact on the target.
 - Warhead will be tested separately
- Verification is achieved by laboratory testing, ground tests, under water tests, simulation and test firings from submerged submarines against real targets.
- **The functional chain will be verified by industry by late 2015.**

Verification Firing



Test Firing Sequence

1. Target detection / acquisition by submarine's sonar
2. Transfer of target data to missile
3. Push-out of missile from submarine, „flight“ to the surface
4. Climb to reference altitude, level flight, seeker in search mode
5. Target identification and marking by the operator
6. Approach to target, tracking by the operator, direct hit

IDAS Verification Firings



... in German Norwegian Cooperation

- **Missile System:**

IDAS



- **Firing Platform:**

Ula Class Submarine



- **Preferred test range:**



ANDØYA TEST CENTER



Timeline:

- Initial Development Program (IDP): 2011 – 2015
- Qualification – ILS – Preparation of production: 2016 – 2018
- Production: from 2018 on

Important to note:

- IDAS is back in the German Forces mid-term plan under the new procurement process CPM nov!



IDAS - game changer in (anti) submarine warfare!

- Worldwide first active self defence against ASW for submerged submarines – we have shown it works!
- True multi-purpose weapon – new roles for submarines
- Highly precise and flexible through Human in the Loop Concept
- Coastal Attack capability
- Very easy to integrate into existing (such as Ula Class) and new submarines
- In it's records the IDAS project has always been an example for excellent cooperation between German and Norwegian defence industry – and there is more to come!