

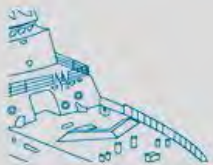


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Navigation embedded Command and Control Systems

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Outline

- Introduction
- Requirement Analysis
- Navigation Embedded Command&Control
- System Example



Introduction

Task of Modern Navies:

- Traditional conflicts but also small and volatile threats

- Patrolling EEZ
- Illegal immigration
- Smuggling
- Piracy
- Terrorists/Warlords

Asymmetric Treats

- Appropriate answer required!



Introduction

What means Appropriate Answer?

- Economically efficient
- Operationally efficient

Small/Medium Combatants

- FPV, FAC, OPV
- Versatile, economically
- No CMS

Full Combatants

- Corvettes, Frigates, Destroyers
- Budget demanding
- Excellent CMS ,CIC



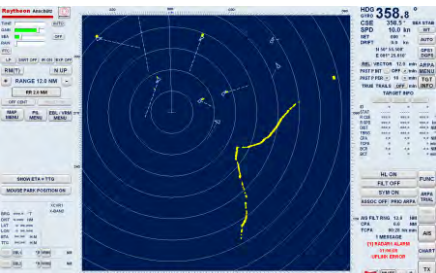
Tailor Made/Smart Solutions are Required!

Introduction

Navigation Bridge Embedded C2 Systems

- Basis: State of the art INS
- Task orientated system architecture
 - Radar, ECDIS, Conning and **C2**
- Cost effective
- Personnel effective
- Balance between resources and operational profile

Collision avoidance



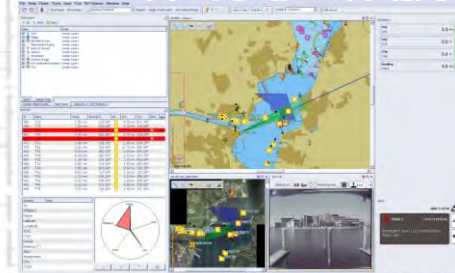
Route Planning/Monitoring



Sensor Surveillance



Command&Control



Requirement Analysis

Classical CMS Tasks

Manage sea battles / Fire missiles behind front lines / Air defense

Use-cases:

- Combat Situation Awareness
- Battle Management
- Decision Management/System
- Data Communication/Link
- Effector Management/Degradation
- Sensor Management
- Mission Planning

Essential use cases!

Which are really important?



Tactical Enhanced Navigation

Basis : State of the Art Integrated Navigation System (INS)

- Real integrated / not loosely coupled
- Task oriented system
- Open architecture
- Decoupling hardware/software



Tactical Enhanced Navigation

Basic INS Structure:

- Data Back Bone
high speed, redundant network
- CCRS
sensor management system
- Target Management (TM)
Associate targets from all connected sensors
- Central Alert Management CAM
alert handing for all connected applications
- System Health Monitoring
Performance and status information
- User Setting Managment

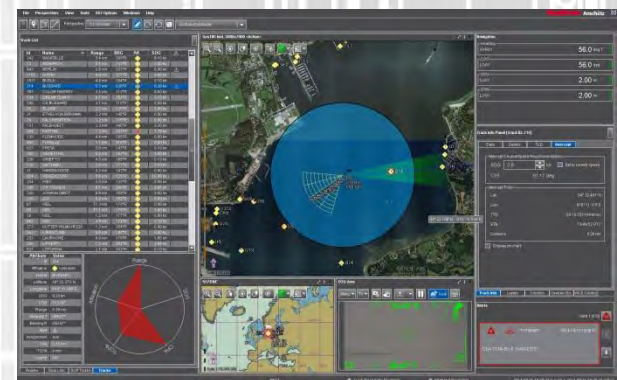
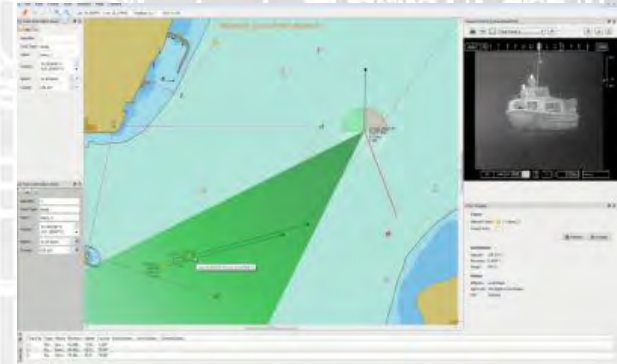


**Infrastructure for
Command &
Controle**

Tactical Enhanced Navigation

➤ INS optimally suited as base for Command & Control Extensions:

- Situation Map
special Overlays
tactical calculations
 - EOS Control
 - Basic Weapon Control
 - Database
-
- Transforms into a Command & Control oriented Mission Management System



System Setup



X/S-band navigation radar



2/3D-radar



EO-sensor

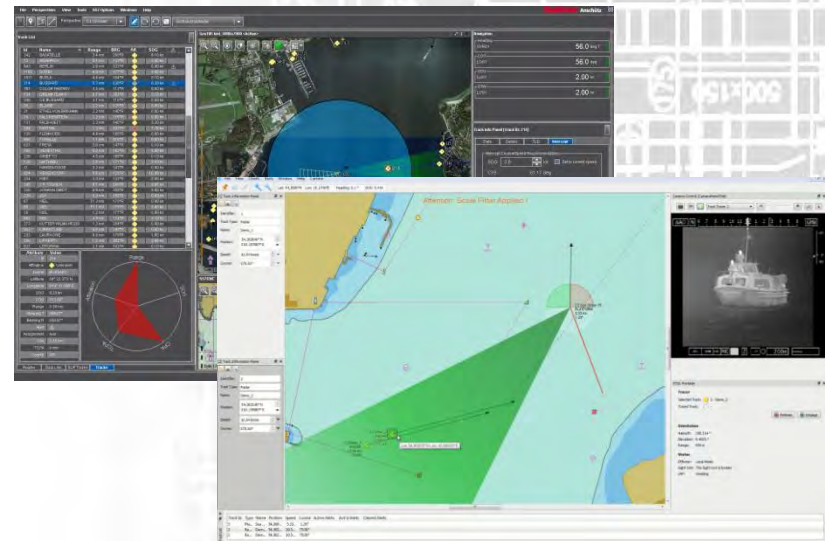


Sensors



System Setup

Sensors



Tactical situational awareness (C2)

System Setup

Sensors



Effectors

Countermeasure systems



Non-lethal effectors



Medium caliber gun



Self-contained weapon station

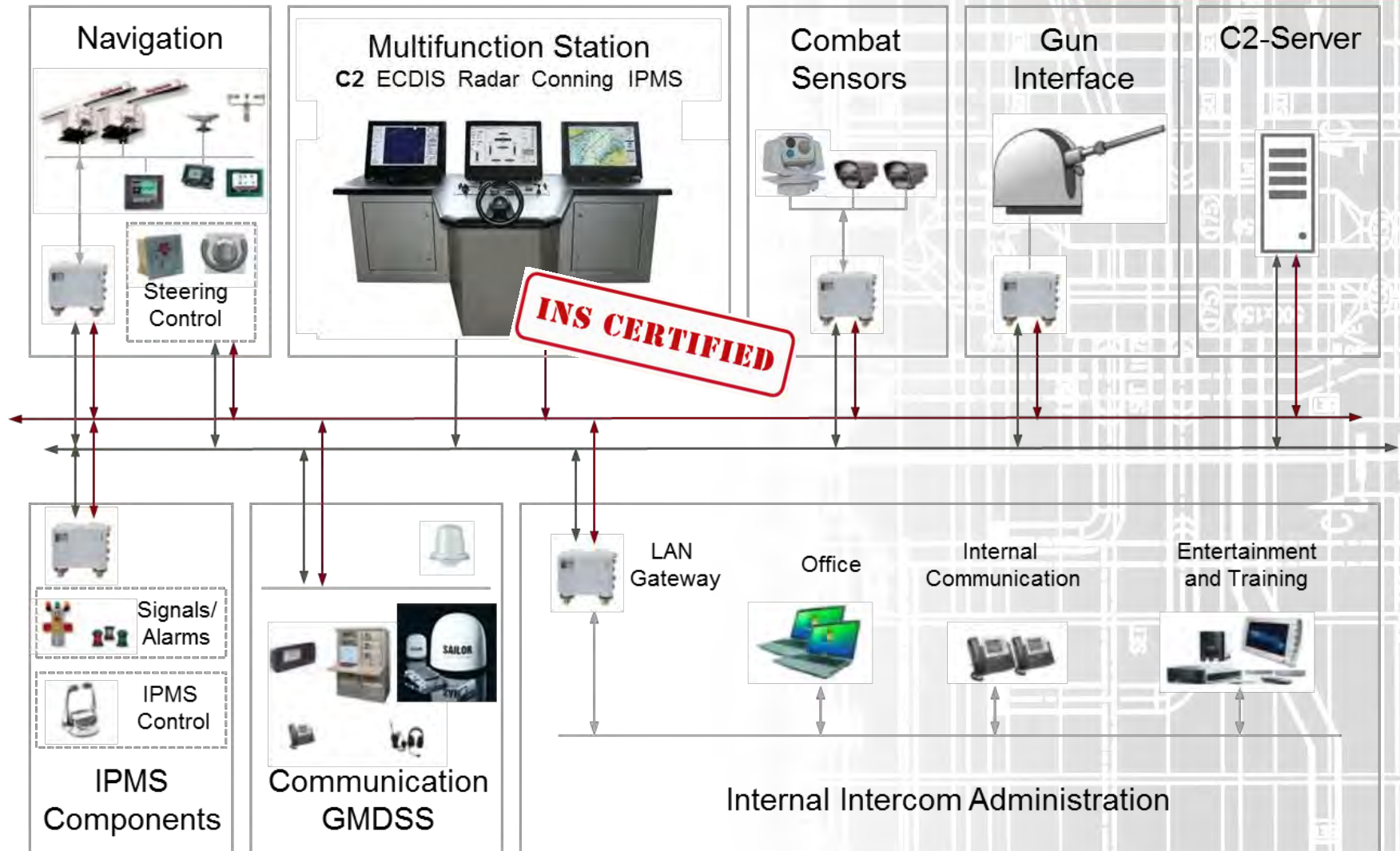


Example

- SYNTACS (by Raytheon Anschütz)
Synopsis Tactical Command System
base on Synopsis Integrated Bridge System
IMO Compliant, no export restrictions
- Coast Guard Mozambique
Command and Control
- OPV Slazak Poland
tactical Bridge enhancement
- T26 Frigates UK Navy
tactical Bridge enhancement



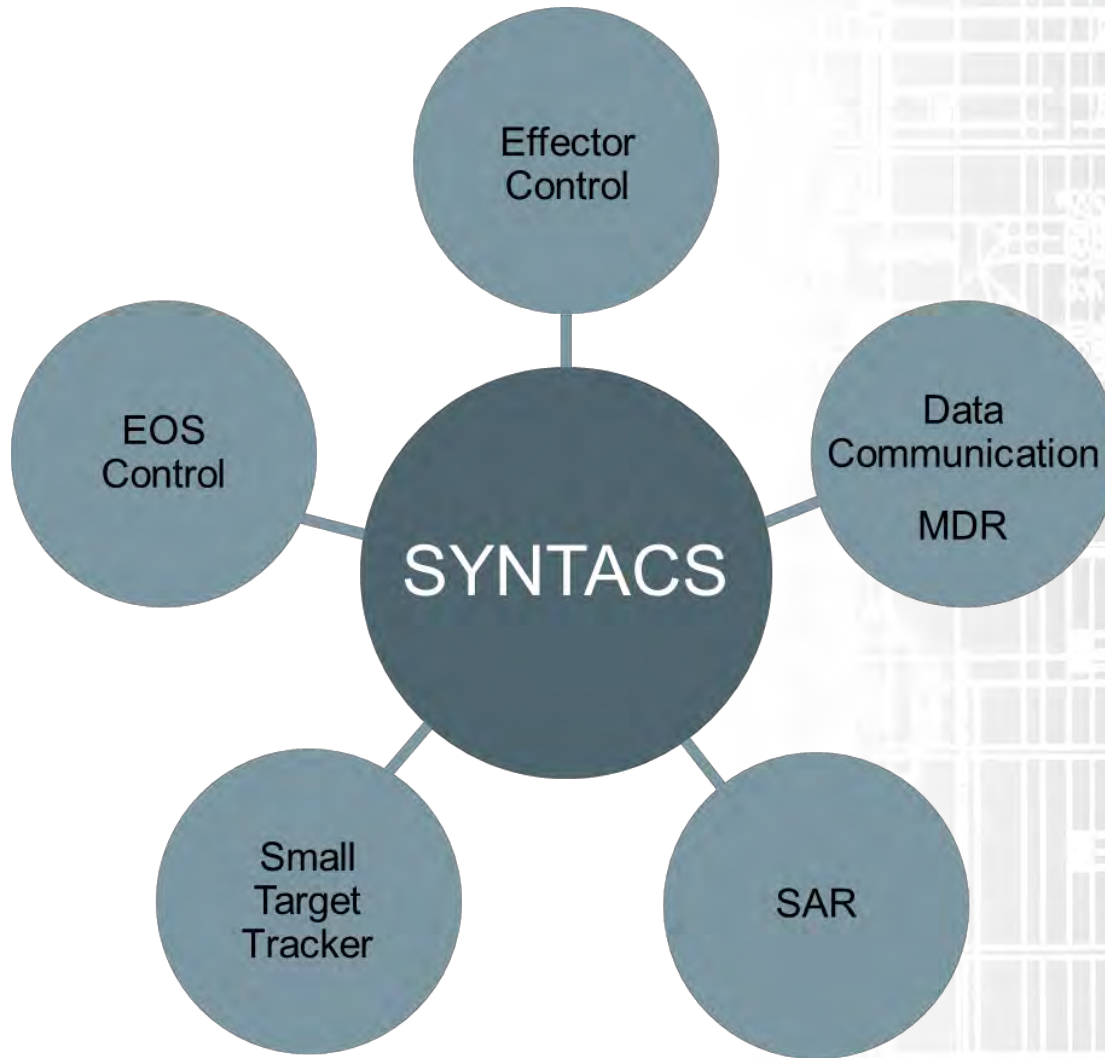
Typical System Layout



SYNTACS- C2 Operator HMI



Customer Defined Options



- Customizable with Apps:
Helo Guidance Stationing

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Conclusions

- Innovative Approach for Command & Control
 - Navigation embedded
 - Mission/capability management
 - Surveillance/sensor/weapon management
- Personnel/space/cost saving
- Small Boats as well as full combatants
- Export free
- In Service



SYNTACS
SYNOPSIS TACTICAL
COMMAND SYSTEM



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