ISI

INTEROPERABILITY
SYSTEMS
INTERNATIONAL

OUR VISION

YOUR INTEROPERABILITY
AND SITUATIONAL
AWARENESS SUPREMACY

> Mission Integration & Management System - M²IMS

> Air Defence C2 System

> Universal Link System - ULS
> TDL Planning & Design tool - MTPS & NDT

> Universal Test & Training System - UTTS

> Portable Reconnaissance Image Screening System - PRISS

Net-Centric Naval Warfare through modern Tactical Data Links

Presentation Outline

- Corporate presentation

- Net-Centric Naval Warfare through modern TDLs

- National Tactical Data Link network

- Achieving Net-Centric operations through a Multi Tactical

  Data Link Gateway

- Conclusions

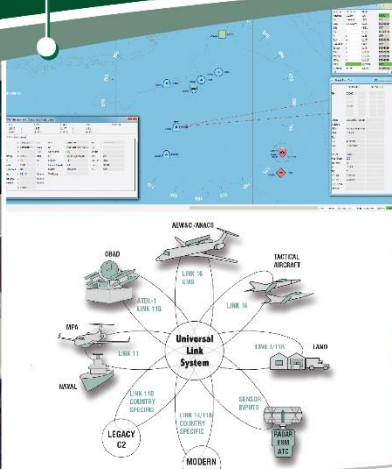- Cooperation proposal under the IDDM concept
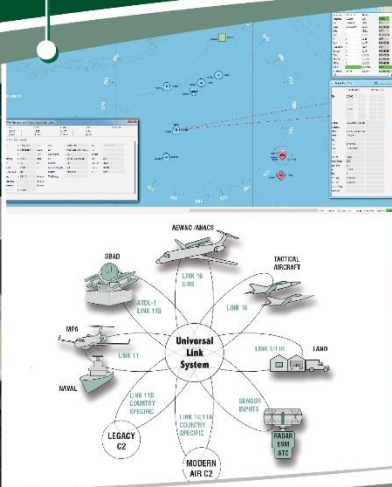
Corporate Presentation

> Portable Reconnaissance Image Screening System - PRISS
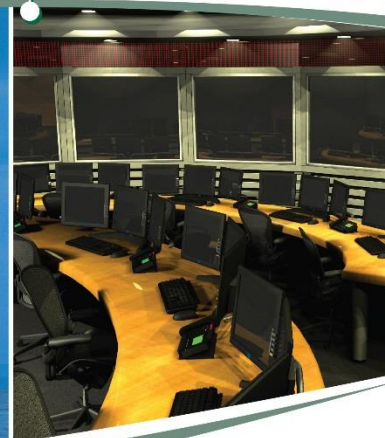
> Universal Test & Training System - UTTS

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> Mission Integration & Management System - M²IMS

> Air Defence C2 System

Universal Link System

AEW&C-AWACS

GBAD

TACTICAL AIRCRAFT

JTIDS-1 LINK 11B

LINK 16

MP6

LINK 16/TIS

LAND

LINK 11

NAVAL

LINK 11B COUNTRY SPECIFIC

SENSOR INPUTS

LINK 16/11B COUNTRY SPECIFIC

RADAR BSM ATC

LEGACY C2

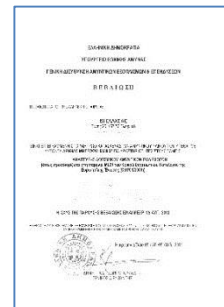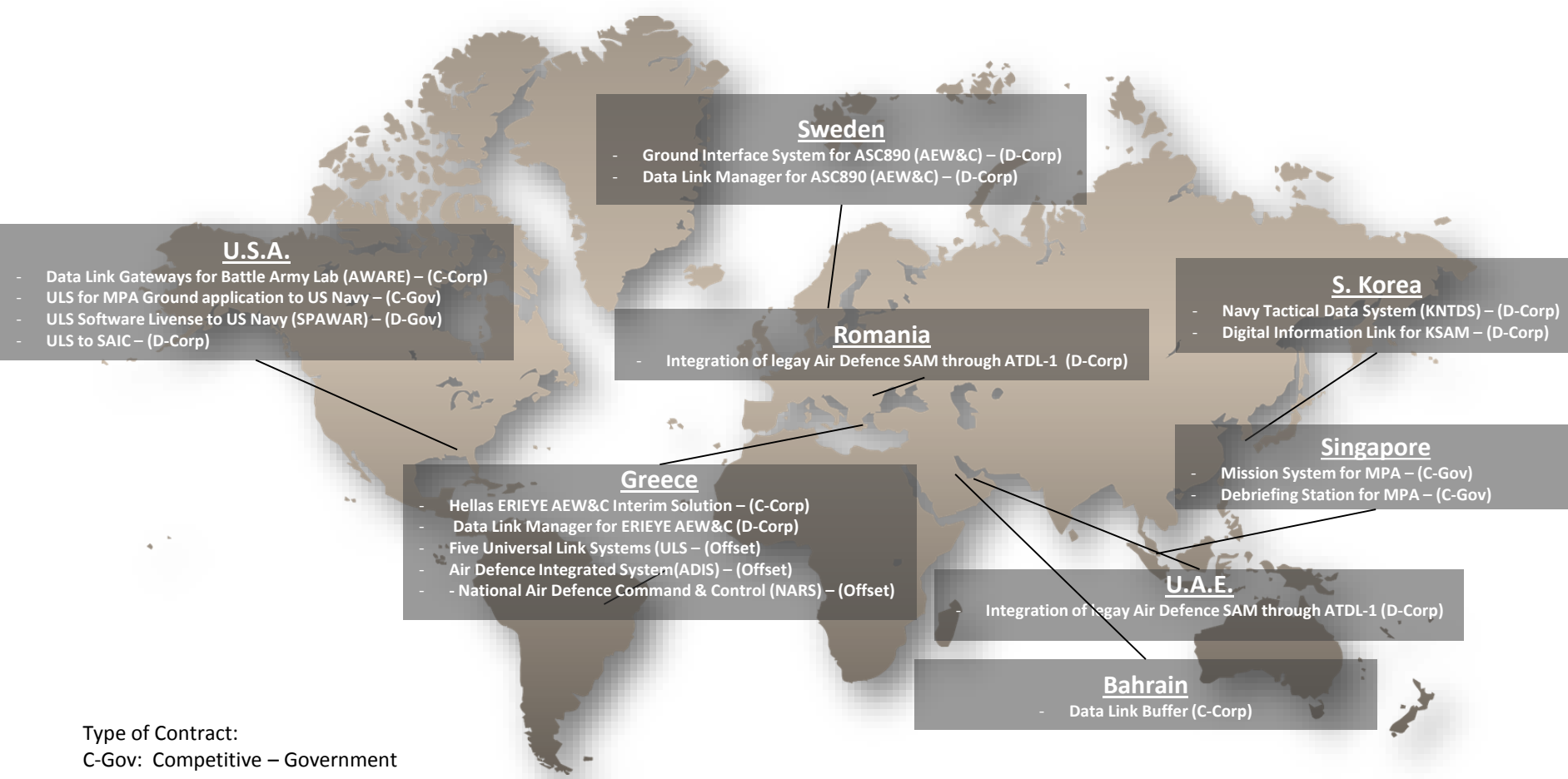MODERN AIR C2

Executive Summary

- Since 1993, **ISI** has been engaged in the defense sector and has delivered turn-key high quality operational and training systems for Land, Air and Naval applications

- Specializes in the specification, design, development, integration, installation, testing and follow on support of:
  - **Tactical Data Links** (NATO & US, i.e. Link 11 A/B, Link 16, IJMS, JREAP, ATDL-1, Link 22)
  - **National and customized Tactical Data Links solutions**
  - **Tactical Data Link Planning & Design Tools**
  - **Mission and Tactical C2/C3 Systems**
  - **Training, Testing & Simulation for C2/C3 Systems**
  - **Surveillance & Reconnaissance applications**

- Development Process and Quality Assurance are certified according to ISO 9001:2008

- Develops and integrates h/w and s/w in accordance to procedures conforming to DoD MIL-STD-498 & IEEE12207 standards

- Systems are based on latest COTS components that comply with the demanding military, industrial and environmental standards

ISI Domains and related Products

Market Area	Product Line
Mission & Tactical C2/C3 Systems	- Maritime Mission Integration & Management Systems (M^2IMS) - Universal Link System (ULS) - Air Defence Command & Control System (NARS)
Data Links & Interoperability Solutions	- Universal Link System (ULS) - Multi Tactical Data Link Planning Tools (MTPS) - L16 Network Design Tool (NDT) - Data Link Extraction Tool (Morpheus)
Training Systems	Universal Test & Training System (UTTS): - Mission Trainer for MPA and AEW&C - Embedded Naval Trainer - Firefinder Classroom Trainer
Test and Simulation	Universal Test & Training System (UTTS): - Data Link Simulators - Radar Video Simulator - Software Support Center
Surveillance & Reconnaissance	- Maritime Surveillance System – MSS - Portable Reconnaissance Image Screening - PRISS

INTEROPERABILITY SYSTEMS INTERNATIONAL

ISI

Sweden
- Ground Interface System for ASC890 (AEW&C) – (D-Corp)
- Data Link Manager for ASC890 (AEW&C) – (D-Corp)

U.S.A.
- Data Link Gateways for Battle Army Lab (AWARE) – (C-Corp)
- ULS for MPA Ground application to US Navy – (C-Gov)
- ULS Software Liivense to US Navy (SPAWAR) – (D-Gov)
- ULS to SAIC – (D-Corp)

S. Korea
- Navy Tactical Data System (KNTDS) – (D-Corp)
- Digital Information Link for KSAM – (D-Corp)

Romania
- Integration of legay Air Defence SAM through ATDL-1 (D-Corp)

Greece
- Hellas ERIEYE AEW&C Interim Solution – (C-Corp)
- Data Link Manager for ERIEYE AEW&C (D-Corp)
- Five Universal Link Systems (ULS – (Offset)
- Air Defence Integrated System(ADIS) – (Offset)
- - National Air Defence Command & Control (NARS) – (Offset)

Singapore
- Mission System for MPA – (C-Gov)
- Debriefing Station for MPA – (C-Gov)

U.A.E.
- Integration of legay Air Defence SAM through ATDL-1 (D-Corp)

Bahrain
- Data Link Buffer (C-Corp)
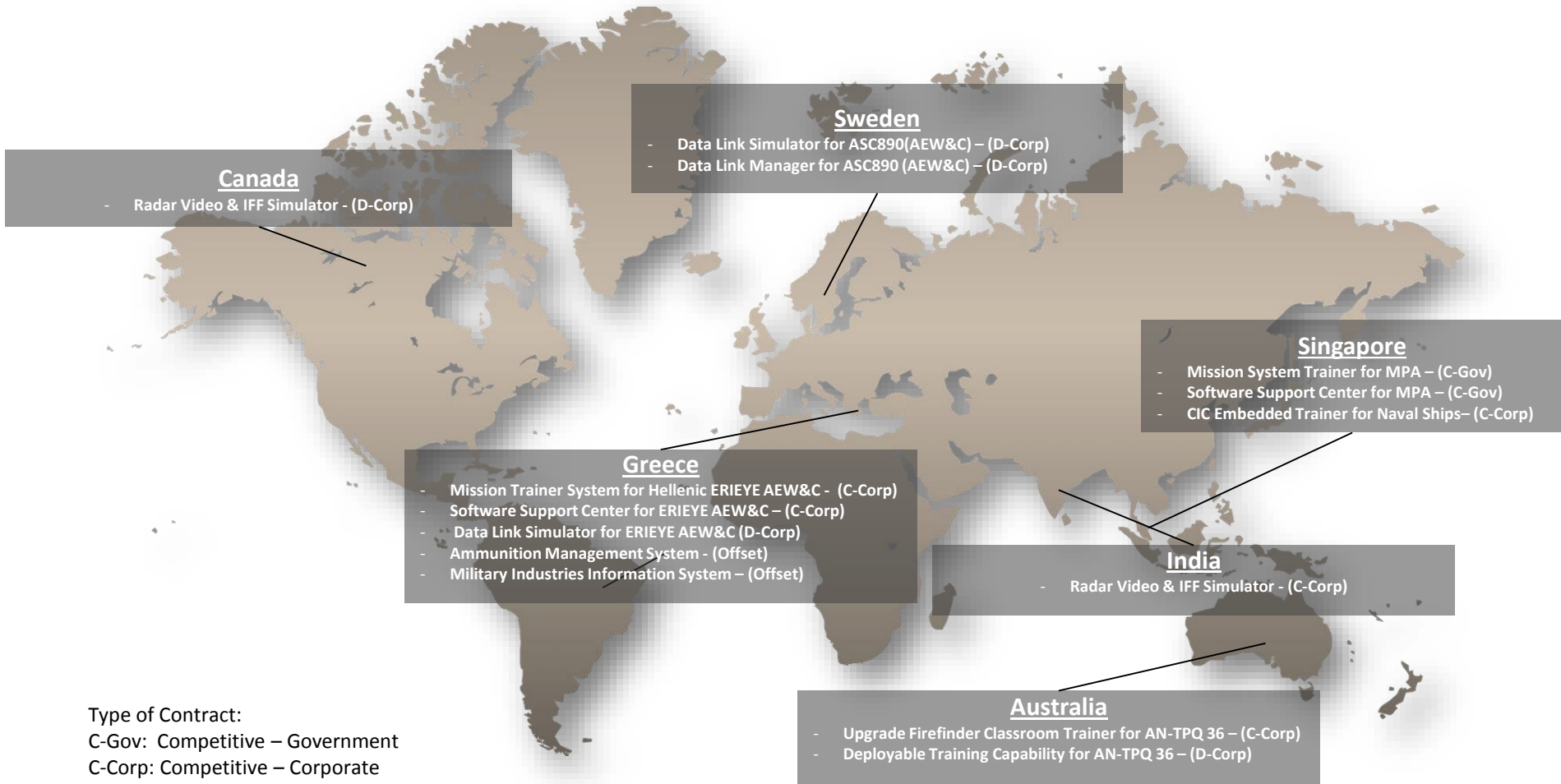
Type of Contract:
C-Gov: Competitive – Government
C-Corp: Competitive – Corporate
D-Gov: Direct - Government
D-Corp: Direct – Corporate
Offset: to fulfill offset obligations of an obligor

Presentation Section:
Delivered Systems

INTEROPERABILITY SYSTEMS INTERNATIONAL

Sweden
- Data Link Simulator for ASC890(AEW&C) – (D-Corp)
- Data Link Manager for ASC890 (AEW&C) – (D-Corp)

Canada
- Radar Video & IFF Simulator - (D-Corp)

Singapore
- Mission System Trainer for MPA – (C-Gov)
- Software Support Center for MPA – (C-Gov)
- CIC Embedded Trainer for Naval Ships– (C-Corp)

Greece
- Mission Trainer System for Hellenic ERIEYE AEW&C - (C-Corp)
- Software Support Center for ERIEYE AEW&C – (C-Corp)
- Data Link Simulator for ERIEYE AEW&C (D-Corp)
- Ammunition Management System - (Offset)
- Military Industries Information System – (Offset)

India
- Radar Video & IFF Simulator - (C-Corp)

Australia
- Upgrade Firefinder Classroom Trainer for AN-TPQ 36 – (C-Corp)
- Deployable Training Capability for AN-TPQ 36 – (D-Corp)

Type of Contract:
C-Gov: Competitive – Government
C-Corp: Competitive – Corporate
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Net-centric Naval Warfare through modern TDLs

> Portable Reconnaissance Image Screening System - PRISS

> Universal Test & Training System - UTTS

> Universal Link System - ULS
> TDL Planning & Design tool - MTPS & NDT
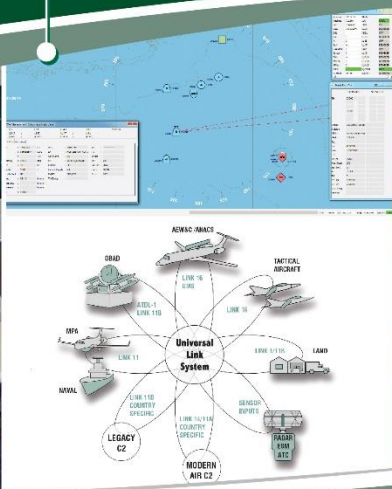
> Mission Integration & Management System - M²IMS

> Air Defence C2 System

Introduction

- Advances of military technology and the evolving types of threats necessitate the development and deployment of C4ISR systems that enable commanders and decision makers to have real-time access on battlefield tactical information in an accurate and precise manner.

- The response time for decision-making and information forwarding to other Command & Control centers or the fighting units in the theater of operations is essential

- Advanced communication systems that support the rapid exchange of Situational Awareness and Command and Control information within the mission elements are critical

- Such an infrastructure creates an interoperable environment for operators, systems, units and forces to operate efficiently together.

- Data Links networks technology contribute significantly to the interoperability of diverse services and platforms (air, surface, subsurface and ground-based) by providing a common medium for the exchange of surveillance, command and control, and intelligence information

Modern Tactical Data Links

- Increased requirements for inter-service and inter-force Data Links, as well as the enhanced capabilities of the tactical Command and Control systems has led to the development of modern Data Links addressing the shortfalls and limitations of older legacy Data Links, such as:

  - Lack of Electronic Protection Measures
  - Insufficient capacity in terms of Tactical Message throughput and bit rate
  - Insufficient robustness, essential for the operation of a Data Link
  - Insufficient error detection and correction capabilities
  - Inflexible and slow data link establishment procedures
  - Limited message standard and data element granularity
  - Limited Routing

- Such modern Data Links applicable in the Naval environment attempt to incorporate the changes of the tactical environment over the last decades, to overcome the limitations of the existing links, and to support the capability of joint operations

- **Communicatios Security** – a strong COMmunications SECurity (COMSEC) system, provided by the inclusion of an integral encryption/decryption device inside the Data Link system

- **Tactical Messages** – tactical data is transmitted in the Data Link system in fixed format messages (Data Link Message set). Each message transmitted has its priority and Quality of Service (QoS). The message set supports a multitude of operational requirements (e.g. Air/Surface/Sub-Surface/Space/Land Surveillance, Electronic Surveillance, EW Intelligence, Mission Management, Weapons Coordination
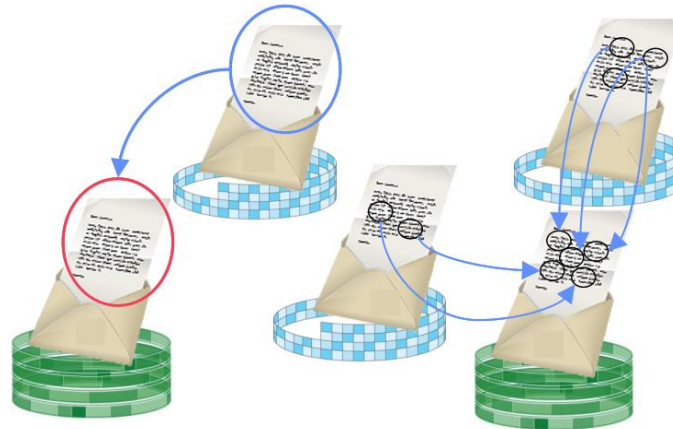
- **Data Link Super Network** – enables seamless communication between different units using different media to satisfy operational requirements. In a Super Network any unit can communicate with all other units without regard to the network they participate, thereby extending the operational theater
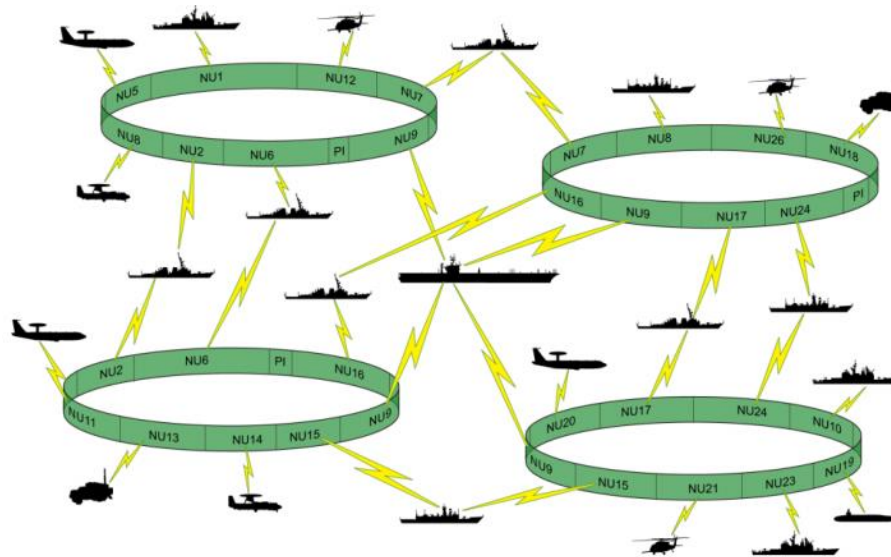
- **Automatic Relay of messages** – provides coverage beyond what the media itself is capable of and the ability to adapt to changes automatically. This removes the need for dedicated air relay platforms
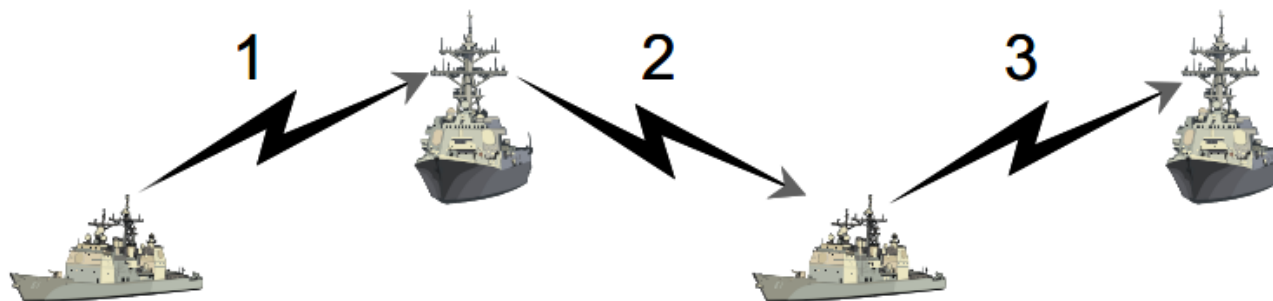
- **Beyond Line-of-Sight Communication** – ability of each network to employ either HF or UHF communications to cover both LOS and BLOS requirements. Within each band, either fixed frequency or frequency hopping radios can be used (anti-jamming)
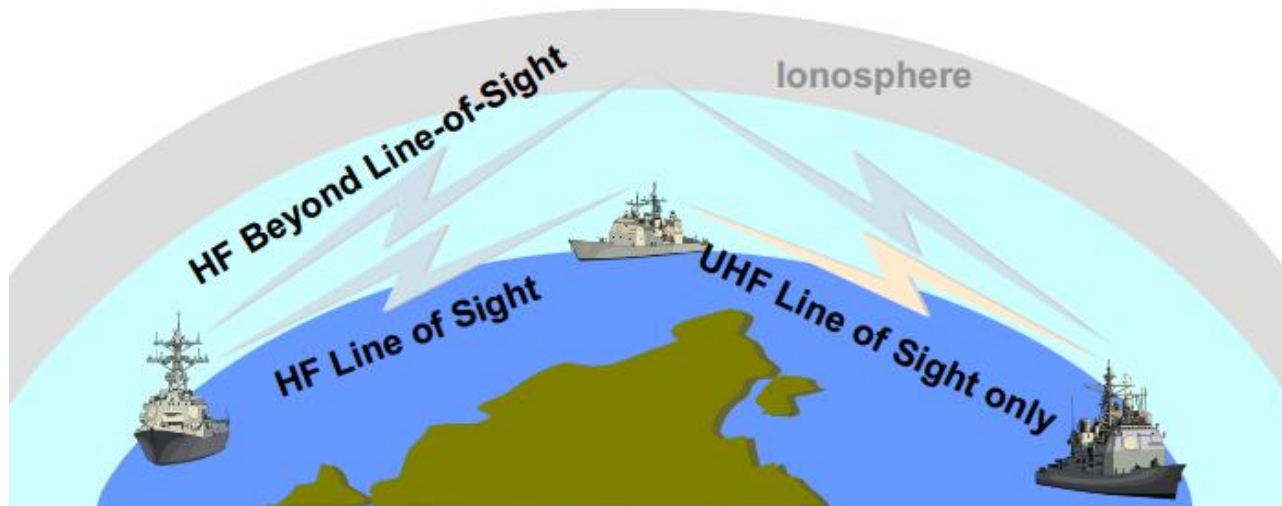

- **Time Division Multiple Access –** the method by which the transmission capacity available to the entire network is distributed amongst its members. Priority injection timeslots are also dynamically allocated reducing the time a unit has to wait before its able to transmit high priority messages
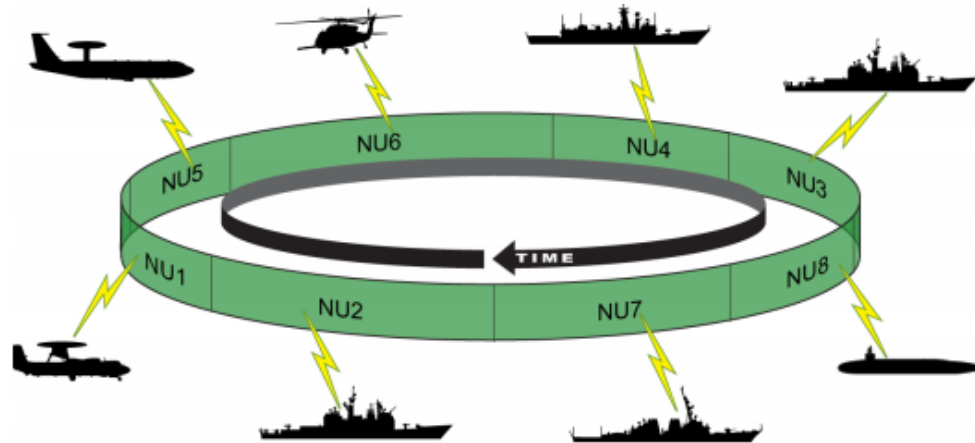
- **Late Network Entry –** after the Super Network has been initiated, units that arrive late may also join the tactical Data Link. The system also supports units that just wish to listen to a network
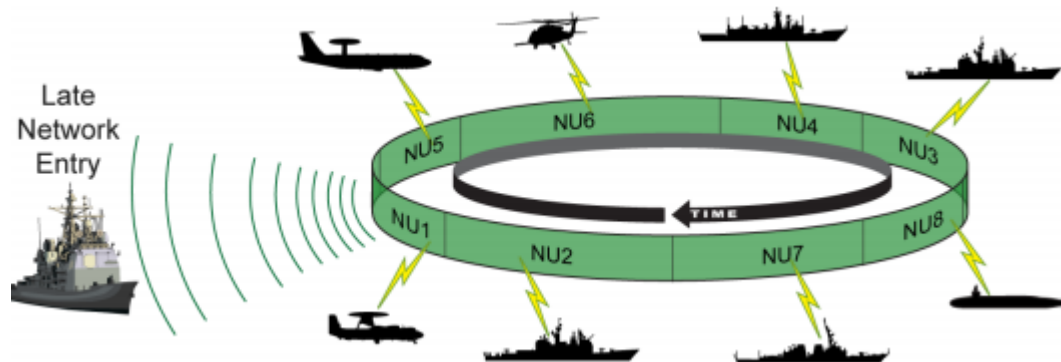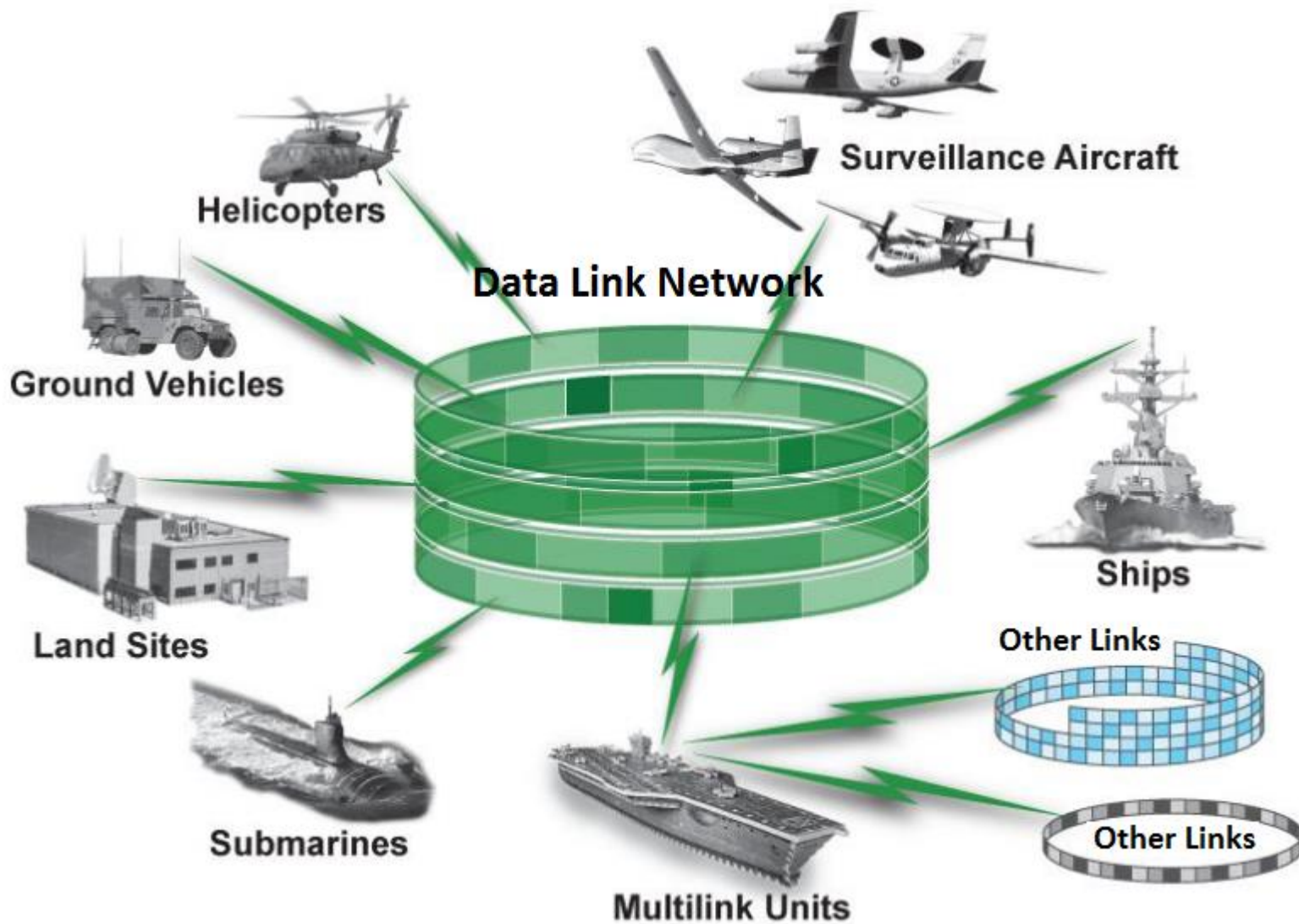
- **Strong Waveforms and Error Correction –** better tactical data throughput and ability to endure operations in adverse conditions

- **Distributed Protocols – No Single Point of Failure –** even though certain units are tasked to perform specific management roles, the system is able to continue its operation even without their presence

SAT COM

Fighter a/c

Data Link Net

AEW&C / ULS

SAT-J

Fighter a/c

MPA / ULS

Helos

Data Link Net

Link 11B / ATDL-1

H.Q. / ULS

Air Defense
Missile System

Radar

Command Center / ULS

Link 11B / ATDL-1

Naval Ships /
ULS

Naval Ships /
ULS
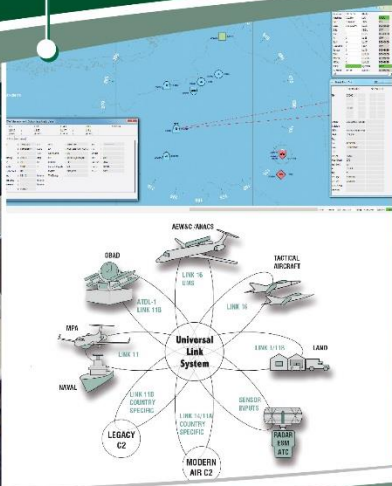
Legacy SAM

National Data Link

> Portable Reconnaissance Image Screening System - PRISS

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> Universal Link System - ULS
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National Tactical Data Link Network

- Generate and disseminate the Common Operational Picture (COP), thus improving Situational Awareness (SA) throughout all platforms, assets and Command Levels

- Provide the backbone for inter and intra service exchange of tactical information within the Armed Forces environment, resolving inter-service interoperability issues

- Integrate all units/platforms into a common tactical network with appropriate information forwarding and/or relay by multi-link capable gateways

- Provide a Fully operational and integrated tactical operations network

- Provide for command and control information flow amongst network participants

- Provide the ability to add additional NTDL capable units/platforms to the network in the future

- Enable Network-centric operations

National Tactical Data Link Network
Conceptual Diagram
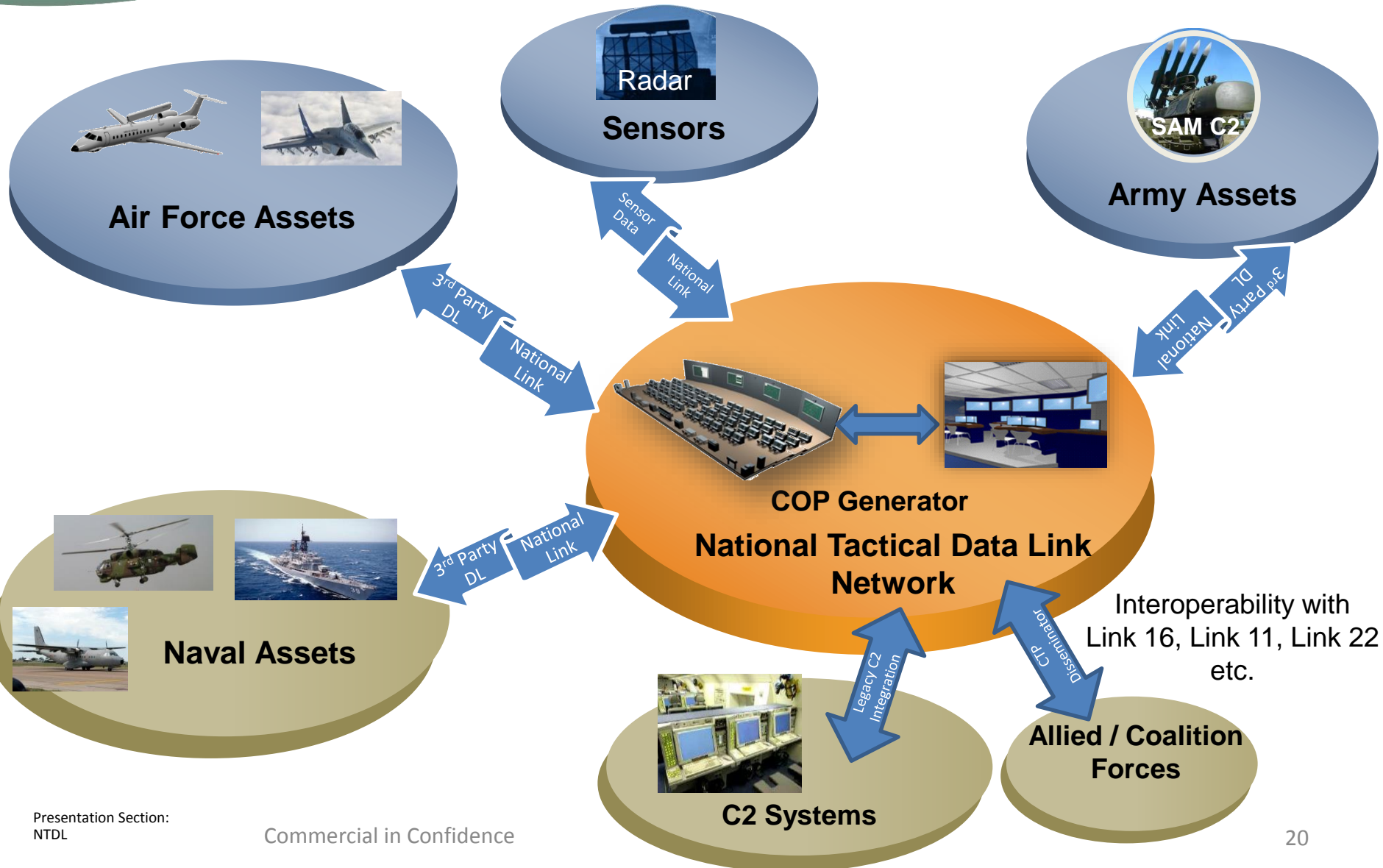
NTDL – Supported Operations

- The NTDL's data element and message level shall support the following types of operations:

    - Air Surveillance

    - Surface/Maritime Surveillance

    - Subsurface Surveillance

    - Electronic Warfare

    - Intelligence

    - Command and Control

    - Weapons Management and Coordination

    - Information Management

- Additionally, its open modular architecture and interfacing protocols shall attend to possible future requirements:

    - Expansion at the data element and message level to provide for coverage of other operational functions, such as video.

   - Incorporation of possible dissimilar data links used by other assets (existing or future).

Multi Data Link Gateway Engine providing participation and forwarding capability (according to STANAG rules), among Link 16, Link 11A/B, Link 1, JREAP, IJMS, ATDL-1, Link 22 and National and Customer specific TDL
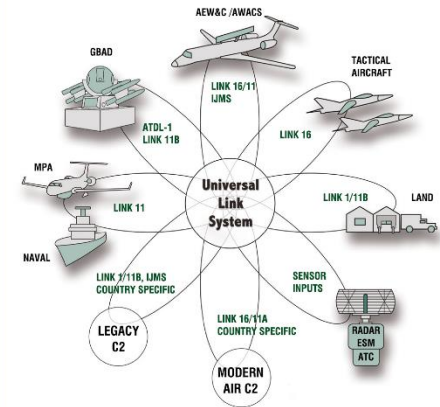
Multi Data Link Gateway Engine

The ULS is a versatile, scalable multi Data Link Command, Control and Communications (C3) system suitable for Land, Sea and Air Platforms

- Multi Data Link Processor with a complete STANAG compliant implementation of all standard U.S. & NATO Data Link protocols, including a proprietary customizable protocol, to be used by any Nation

- Provides participation and forwarding capability (according to STANAG rules), with advanced user-defined filters amongst Link 16, Link 11A/B, Link 1, JREAP, IJMS, ATDL-1, National and Customer specific TDL. Expandable to Link 22, VMF

- Is scalable and configurable (HW, SW and HMI) with regard to the number and the type of Data Links and Sensor inputs

- Performs Data Fusion, Track Management, Correlation and Decorrelation, Commands & Weapons Mgmt., ID/IFF Conflict, Pairing, Filtering, Threat Warning etc.

- Acts as force multiplier offering an increase in the Situational Awareness by delivering the Common Tactical Picture (CTP) and improving control of all linked assets

- Can be easily integrated into any existing C2 system by expanding its capabilities
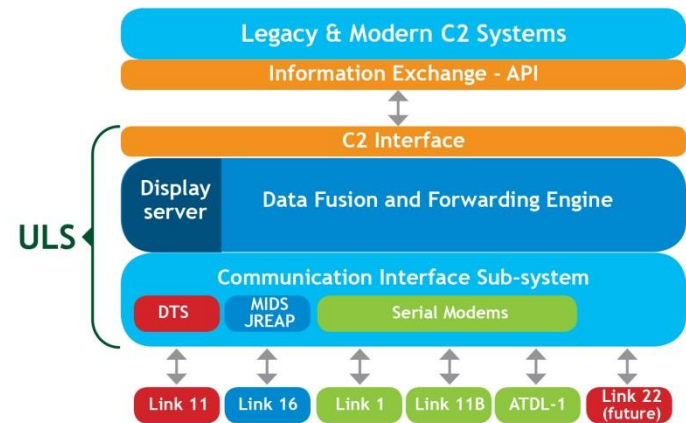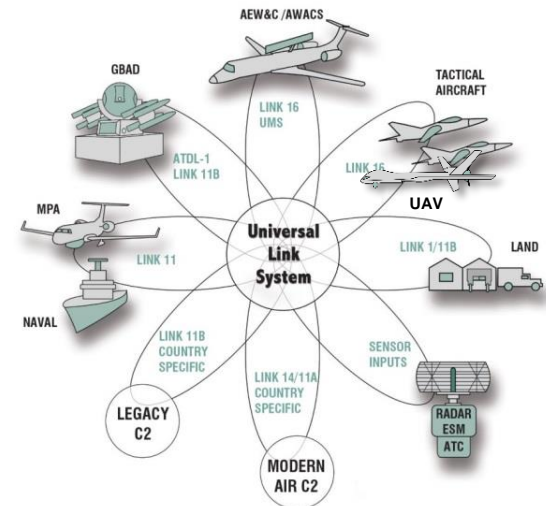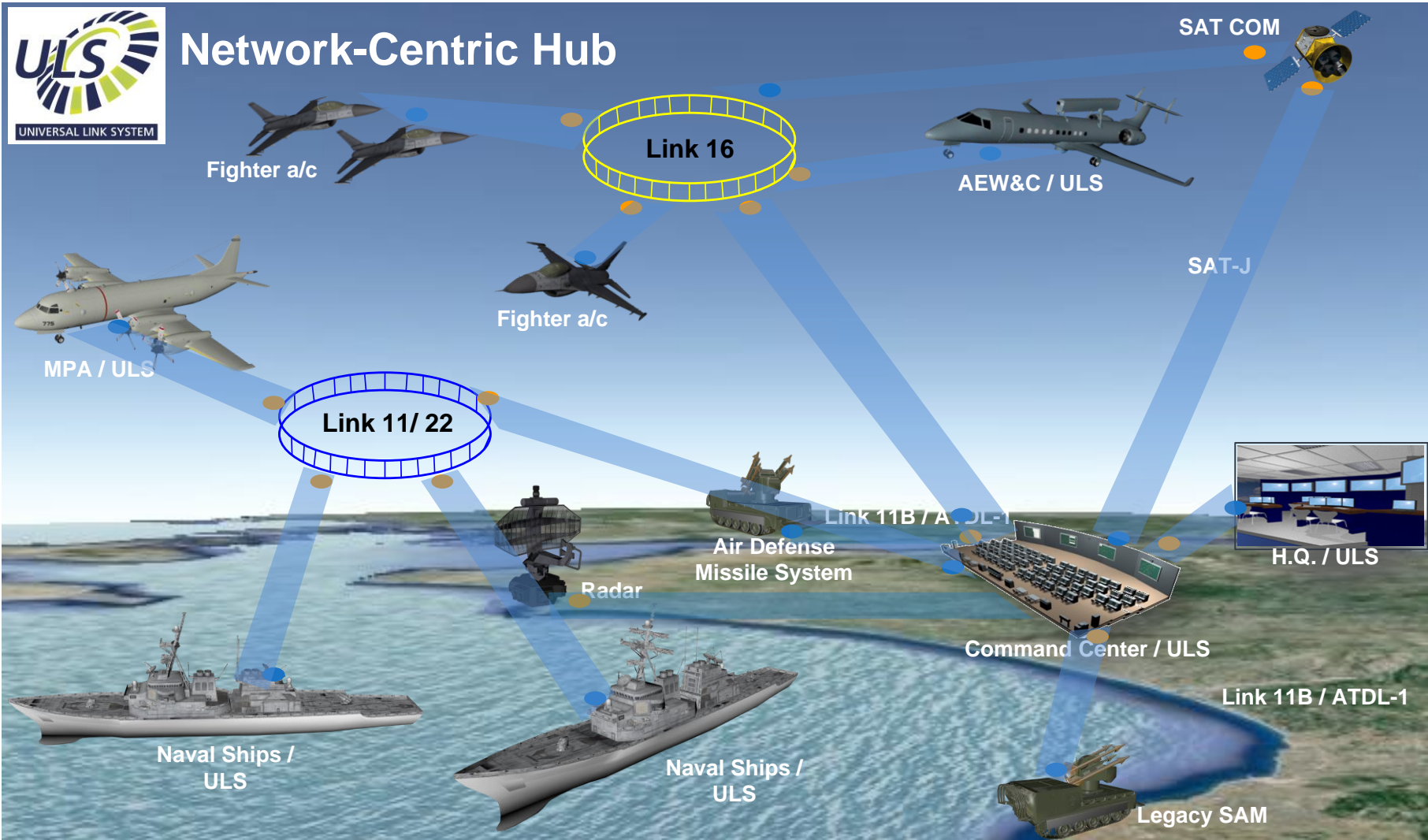
Conclusions

- Data Link networks technology has become the tool that support the rapid, secure and effective exchange of Situational Awareness and Command and Control information within the mission elements

- Data Links contribute significantly to the interoperability of diverse services and platforms by providing a common medium for the exchange of surveillance, command and control, and intelligence information

- The exchange of such information leads to the creation of a Common Recognized Operational Picture (CROP) amongst the networked systems thus significantly improving Situational Awareness, a significant Force Multiplier in today's modern warfare operations

- Modern Data Links are incorporating rapid changes of the tactical environment, to overcome the limitations of the existing links, and to support the capability of joint operations

- National Data Links allow nations to design and develop their own (best-of-breed) network protocol, both on the message, as well as communication levels, satisfying specific national requirements

Cooperation proposals under the IDDM Concept

- ISI is willing and able to cooperate with the Indian Navy and Industry for the purpose of developing modern Data Link network technology through Transfer-of-Technology and Know-how, in accordance with the Indigenous Design, Development and Manufacturing (IDDM) concept under the 'Make in India' policy

- Specific proposed areas of cooperation include:

  - Development of a National Tactical Data Link (NTDL), based on the 'best-of-breed' concept of modern Data Link technologies

  - Multi Data Link integration of the NTDL with other existing or future standard Data Links employed by different assets

- Benefits arising from such a development are:

  - Provision of in-country State-of-the-art Knowledge Base, Sustainability and Support in modern Tactical Data Links
  - In-country capability for the integration of NTDL with Combat Management & Command and Control Systems of the Indian Navy and Armed Forces assets