Welcome to C-SIGMA VI, London. C-SIGMA is an international initiative intended to foster wider cooperation and exchange in the use of and access to satellite based maritime surveillance information at global level.

**Day 1** INMARSAT CENTRE, 7 December 08.30 - 17.15

**REGISTRATION 8.30 - 9.00**

Organiser Welcome
Rary Fitzpatrick
C-SIGMA, General Secretary

Sponsor Welcome
Stuart Martin
Satellite Applications Catapult Ltd, Chief Executive Officer

Presidents Welcome
Guy Thomas
C-SIGMA, President

**KEYNOTE SESSION**

Chair: Guy Thomas
Dr Josef Aschbacher
Leendert Bal
Brigadier David Evans

**10.45 - 11.15 COFFEE BREAK** Sponsored by National Space Centre (Ir) Ltd

**SESSION 2**

Chair: RADM Nick Lambert
Satellite Applications Catapult, Maritime Domain Expert

John Murray
Society of Maritime Industries, Chief Executive Officer

Ray Fielding
UK Space Agency, Head, Int'l Partnership Space Programme

Michiel Meijer
Inmarsat, Senior Director, Vertical Market Management

Eoin Fannon
Office of the Attorney General, Ireland, Legal Counsel

Q & A

**12.30 - 13.45 LUNCH** Sponsored by Polesat

**SESSION 3**

Chair: Chris Reynolds
Irish Coast Guard, Director

LV Sébastien Badel
French Ministry of Defence - Navy Staff, Program Officer

Karma Bryan
NATO CMRE, Maritime Security Programme Manager

Lt Cdr Brian Matthews
Irish Naval Service, Officer in Charge Naval Computer Centre

Dr Harm Greidanus
European Commission - JRC, Scientific Project Officer

Q & A

**15.15 - 15.45 COFFEE BREAK** Sponsored by National Space Centre (Ir) Ltd

**SESSION 4**

Chair: Chris Reynolds
Irish Coast Guard, Director

Peter Young
Telespazio VEGA, CEO

Egbert Schwarz
DLR, German Remote Sensing Data Center

Jeff Hurley
MDA Geospatial Services, Manager, Business Development

Q & A

**ADJOURN 17.15**
### Day 2
**INMARSAT CENTRE, 8 December 09.00 - 17.15**

#### OPENING 9.00
- **Chair:** Guy Thomas
- **C-SIGMA, President**

#### SESSION 5
- **Dr Gerard Margarit-Martin**
- **GMV Aerospace and Defence S.A.U. Remote Sensing Specialist and Project Manager,**
- **William Jefferies**
- **LOOKNorth, Executive Director**
- **Markus Jochum**
- **Airbus Defence and Space, Future Programs Manager**
- **Q & A**

#### 10.30 - 11.00 COFFEE BREAK
**Sponsored by URTHecast**

#### SESSION 6
- **Chair:** Guy Thomas
- **C-SIGMA, President**
- **Rob Ayasse**
- **Kongsberg Satellite Services (KSAT), International Sales Manager for Energy, Environment & Security**
- **Daniela Dobrev-Nielsen**
- **AZO, Business Development**
- **RADM Nick Lambert**
- **Satellite Applications Catapult, Maritime Domain Expert**
- **Greg Flessate**
- **ORBCOMM, SVP & GM, Government and AIS**
- **Q & A**

#### 12.30 - 13.45 LUNCH
**Sponsored by ORBCOMM**

#### SESSION 7
- **Chair:** Rory Fitzpatrick
- **C-SIGMA, General Secretary**
- **Graham Stickler**
- **exactEarth Ltd, VP: Products & Services**
- **Stig Erik Christiansen**
- **Kongsberg Seatex AS, Product Manager**
- **Pierre-Damien Vaugour**
- **Spire Global, Inc. Business Development Manager**
- **Dr. Nico Spyropoulos,**
- **Urthecast, Vice President Sales, Europe**
- **Q & A**

#### 15.15 - 15.45 COFFEE BREAK
**Sponsored by URTHecast**

#### SESSION 8
- **Chair:** Rory Fitzpatrick
- **C-SIGMA, General Secretary**
- **Capt Jatin S Bains**
- **Channel Logistics LLC, President**
- **Presenter**
- **Global Fishing Watch, Partner**
- **Paul Kerzanski**
- **A-T Solutions, PAE Inc. VP Worldwide Maritime**
- **Q & A**
- **C-SIGMA Overview & Conclusions**

**ADJOURN 17.15**

### Day 3
**Greenwich Visit 10.30**

Visit to Royal Greenwich Observatory and Maritime Museum.

Meet at Maritime Museum at 10.30am.

No booking required.
ORGANISERS WELCOME  RORY FITZPATRICK
C-SIGMA, General Secretary

Rory is CEO of National Space Centre (Irl) Ltd (NSC), located in Effordstown in Co Cork, Europe’s most westerly teleport.

NSC provides full service groundstation facilities to satellite owners and co-manages the entire satellite communications service for the Irish Naval Fleet at home and abroad.

NSC has invested heavily in Earth Observation Technology and Platforms in recent years and partners with Irish and Global organisations and institutions on commercial and space related R&D Projects including several environmental and maritime tracking projects.

NSC houses the C-SIGMA Project Office.

SPONSORS WELCOME  STUART MARTIN
Satellite Applications Catapult Ltd, Chief Executive Officer

Stuart Martin is Chief Executive Officer of The Satellite Applications Catapult, sponsors of C-SIGMA VI.

The Satellite Application Catapult is an innovation & technology company fostering economic growth through the exploitation of space. The Catapult is one of seven such organisations set up in the UK as world-leading centres of excellence in technology and innovation, each focused on a specific area of economic growth.

The Satellite Applications Catapult is the centre for the development and commercial exploitation of space and satellite-based products, services and applications.

PRESIDENTS WELCOME  GUY THOMAS
C-SIGMA, President

Guy has been involved in surveillance for over 40 years, as operator, systems engineer, Test Director (EP-3E & RC-135W), inventor and developer (Satellite AIS).

Prof Thomas is retired from the US Navy, the USCG, and Johns Hopkins University’s Applied Physics Lab, and holds 6 warfare qualifications, USN Surface/Air/Submarine Space & USAF Air & Space.
Keynote Session

**ESA, D/EO PROGRAMMES**

**Dr Josef Aschbacher**, Head of Programme Planning and Coordination Service

The European Space Agency (ESA) is Europe’s gateway to space. Its mission is to shape the development of Europe’s space capability and ensure that investment in space continues to deliver benefits to the citizens of Europe and the world.

Earth observation to better manage our planet Earth observation satellites, coupled with in-situ measurements provide essential information to better understand our Earth system. The last decade showed a significant shift from R&D dominated space missions towards more operational systems. In particular the Copernicus Sentinel missions will allow, once fully deployed, to measure a variety of parameters, including sea level height and temperature, land cover, atmospheric trace gases as well as parameters relevant for climate change and disaster management.

**EUROPEAN MARITIME SAFETY AGENCY**

**Leendert Bal**, Head of Department Operations

EMSA is an EU Agency with a mission to ensure a high level of maritime safety, maritime security, prevention of and response to pollution from ships and oil and gas installations. Overall purpose is to promote a safe, clean and economically viable maritime sector in the EU.

The European Maritime Safety Agency (EMSA), a regulatory Agency of the European Union, is providing a number of satellite based information services focussing on the “maritime picture”. Information is given to authorities of EU Member States, having to perform a “coast guard” task at sea and to a variety of EU bodies and international organisations. The current status will be presented.

**ROYAL NAVY/ROYAL MARINES**

**Brigadier David Evans**, Information Superiority

The United Kingdom Royal Navy is the traces its origins to the 16th century and is part of Her Majesty’s Naval Service, which also includes the Royal Marines. The navy maintains a fleet of technologically sophisticated ships and currently operates three bases in the United Kingdom where commissioned ships are based: Portsmouth, Clyde and Devonport, Plymouth, the last being the largest operational naval base in Western Europe.

The UK Approach to Open Source Intelligence - Context, Open Source, Social Media, Data Analytics and Space - a critical enabler.

**SESSION CHAIR**

Guy Thomas, C-SIGMA President

Coffee Break

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Session 2

SOCIETY OF MARITIME INDUSTRIES
John Murray, Chief Executive
The Society of Maritime Industries is the trade association for the maritime engineering sector in the UK.
The Marine Industries Leadership Council is a government/industry partnership set up to support the growth of the UK marine engineering sector. Two programmes will rely on effective space applications technology for delivery: a proposal to map the seabed of the whole of the UK continental shelf and the development of maritime autonomous systems demonstrators. This is supported by the 2015 edition of the UK Marine Industries Technology Roadmap which was published in September.

UK SPACE AGENCY
Ray Fielding, Head of International Partnership Space Programme
UK Space Agency is an executive agency, sponsored by the Department for Business, Innovation & Skills, responsible for all strategic decisions on the UK civil space programme and providing a clear, single voice for UK space ambitions.
UK Space Agency Partnerships With Maritime User Communities

INMARSAT
Michiel Meijer, Senior Director Vertical Market Management
With a heritage spanning more than 35 years, Inmarsat sets the standard in maritime communications with the world’s most advanced commercial global mobile satellite network.
Smarter Operations for the Future. Maritime communication is going through a revolution. The possibility of a truly connected ship and seamless real-time integration with shore-based operations is no longer just concept, but a reality. This session looks at how the next generation of satellites will support a step-change in ship to shore communications to open up unlimited possibilities for smarter, more efficient and safer shipping today and in the future.

OFFICE OF THE ATTORNEY GENERAL IRELAND
Eoin Fannon, Legal Counsel
The mission of the Office of the Attorney General in Ireland is to provide the highest standard of professional legal services to the Government, Departments and Offices as economically and efficiently as possible and to support adherence to the rule of law.
The Advisory side of the Attorney General’s Office comprises of lawyers who specialise in specific areas of law with the principal duty to assist the Attorney General in performing functions, powers and duties to achieve her mission.

SESSION CHAIR
RADM Nick Lambert, Satellite Applications Catapult, Maritime Domain Expert

Lunch
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POLE STAR

www.c-sigma.org
FRENCH MINISTRY OF DEFENCE - NAVY STAFF
LV Sébastien Badel, Program Officer
The French Navy contributes to the strategy of defense of France by leading permanent missions (including Action of the French State at sea) and non-permanent missions. France is the second world maritime space of 1.1 million km²; the French Navy thus has the duty to control this space in its three dimension to protect the peace and defend French interests. French remote-sensing and AIS satellite based-maritime innovative services called “TRIMARAN” optimizes efficiently until 2015 the use of ships and aircrafts for a lesser cost to fight against the threats, the defense of the sovereignty and the sovereign rights at sea, the control of the risks linked to the maritime activity.

NATO CENTRE FOR MARITIME RESEARCH AND EXPERIMENTATION (CMRE)
Karna Bryan, Programme Manager, Maritime Security
The NATO Centre for Maritime Research and Experimentation (CMRE) is a scientific research and experimentation facility that delivers innovative and field tested science and technology solutions in the maritime domain. CMRE’s Maritime Situational Awareness (MSA) activities are building on recent developments in sensing technologies and information sharing efforts by the development of novel information products with a focus on data-driven decision. The exponential growth of multi-sensor data can overwhelm operators and fail to provide actionable information without techniques to synthesize and contextualize multiple sources of information. Scalable approaches to computational MSA, together with standards for interoperability, are required to deliver the promise of new sensing technologies.

IRISH NAVAL SERVICE
Lt Cdr Brian Matthews, Officer in Charge Naval Computer Centre
The Irish Naval Service is the principal sea going agency for Ireland, responsible for patrolling Ireland’s maritime jurisdiction as well as conducting operations overseas. The Irish Naval Service’s Recognised Maritime Picture Outline: The presentation will describe the process of designing and implementing the Recognised Maritime Picture (RMP) within the Irish Navy, and will demonstrate the transformational effect of network enabled operations through the implementation of a cutting-edge command and control information system. Operating in near real-time, the RMP depends upon a reliable Ku-Band satellite communication solution; this is provided and supported by the National Space Centre (NSC).

EUROPEAN COMMISSION - JOINT RESEARCH CENTRE
Dr Harm Greidanus, Scientific Project Officer
The JRC is the European Commission’s in-house science service which employs scientists to carry out research to provide independent scientific advice and support to EU policy. The presentation will discuss results of the PMAR-MASE project, that monitored the Western Indian Ocean during 15 Sep 2014 – 15 Sep 2015. About 20 million ship reports were received monthly, from LRIT, coastal AIS networks and up to 16 AIS satellites. The quality of the data will be discussed; the completeness and accuracy of the results; the contributions of the various data sources; and the ship density distributions, revealing activities at sea in the area. In addition, satellite SAR images were used to assess the presence of non-reporting ships.

SESSION CHAIR
Chris Reynolds, Irish Coast Guard, Director

Coffee Break
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Session 4

TELESPAZIO VEGA

Peter Young, Chief Executive Officer

Telespazio VEGA is one of the UK’s leading Geo Information companies providing Satellite Radar data, analysis and applications and a Near Real Time service from a User Terminal in Harwell.

Utilising the broader capabilities of Telespazio allows provision of innovative solutions to even the remotest regions of the globe across a wide variety of markets. Development of downstream applications includes geo-information via value adding, user friendly, platforms, as well as cost effective fixed and mobile satellite communications.

DLR

Egbert Schwarz, German Remote Sensing Data Center

EOC conducts research in the field of remote sensing. We seek answers to urgent social questions relating to the environment and climate, mobility and planning, prevention and management of natural catastrophes, and civil security.

Applications to derive maritime value added products like oil spill and ship detection based on remote sensing SAR image data are being developed and integrated at the Ground Station, part of the German Remote Sensing Data Center. Products of meteoric parameters like wind and wave complement the product portfolio. Latest Developments are integration of Sentinel and RADARSAT Data into the existing services.

MDA GEOSPATIAL SERVICES

Jeff Hurley, Manager, Business Development

MDA provides geospatial data, information and monitoring services derived from radar imagery and other sources to customers in defence, energy and mining, and civilian sectors.

Advancing Space-based Maritime Surveillance: MDA continues to improve the capabilities for monitoring the vast expanses of the offshore domain. Recent improvements to RADARSAT-2 have proven particularly useful for this application. The commercialization of a previously unavailable mode for broad area vessel detection brings unparalleled coverage and detection capabilities. MDA has also introduced a new mode for higher resolution image collection, which benefits from a relatively large swath width ideal for maritime monitoring.

SESSION CHAIR

Chris Reynolds, Irish Coast Guard, Director

Adjourn
Session 5

GMV AEROSPACE AND DEFENCE S.A.U.
Dr Gerard Margarit-Martín, Remote Sensing Specialist and Project Manager
GMV is a recognized partner in the field of Ground Segment, Mission Control, GNSS, Payload Data Processing and Remote Sensing Applications and Services
The latest operational campaigns conducted with SIMONS (Ship Monitoring System) will be presented and analysed. Among others, a key milestone has been the detection of a small boat with irregular immigrants on board that was under a Search and Rescue operation within the Alboran Sea. The EO-based detection report served authorities to quickly locate the target within an area of 50,000 km². Other experiments is the test exercise conducted in the Tokyo Bay with accurate ground-truth or the operational missions with the Spanish Navy.

LOOKNORTH
William Jefferies, Executive Director
LOOKNorth is a Canadian Centre of Excellence that identifies, evaluates, manages and accelerates the development of remote sensing technologies that support northern Development.
LOOKNorth has funded operational demonstrations of innovative surveillance solutions that support maritime monitoring in the Canadian Arctic. These have provided operational solutions for commercial operators and northern communities with specific requirements for unclassified situational awareness. The results and application of several of these programs will be presented.

AIRBUS DEFENCE AND SPACE
Markus Jochum, Future Programs Manager
Airbus Defence and Space provides decision makers with sustainable earth observation solutions to increase security, optimize mission planning and operations and to improve management of natural resources.
The TerraSAR-X/PAZ constellation in support of tactical ship route planning in arctic waters.

SESSION CHAIR
Guy Thomas, C-SIGMA President

Coffee Break
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KONGSBERG SATELLITE SERVICES (KSAT)
Rob Ayasse, International Sales Manager for Energy, Environment & Security
Kongsberg Satellite Services (KSAT) is the world’s leading provider of genuinely multi-mission, near real-time, satellite-based vessel and oil spill detection services. The presentation will outline how KSAT draws on all 8 available Synthetic Aperture Radar (SAR) satellites to detect vessels, then correlates that with satellite-based Automatic Information System (AIS) data to pinpoint vessels which have switched off their transponders, and then delivers the information in near real-time. A very recent case study will be used, which was a multi-stakeholder counter-IUU project off the coasts of Liberia and Senegal, which included the ESA, FACT, ExactEarth, the World Bank and KSAT.

AZO - ANWENDUNGSZENTRUM GMBH OBERPAFFENHOFEN
Daniela Dobrev-Nielsen, Business Development
Specialised in building and maintaining global innovation networks and competitions, AZO supports innovations and the creation of new ventures for the commercial use of space applications. In coordinating leading global innovation networks for Satellite Navigation (European Satellite Navigation Competition) and Earth Observation (Copernicus Masters), AZO has established profound expertise in discovering and developing product innovations in the commercial use of satellite applications. The presentation will provide insights on the successful use of ideas competitions as an ultimate driver for commercial growth and highlight dedicated examples from the Maritime domain, comprising both satellite navigation and Earth observation technologies.

SATELLITE APPLICATIONS CATAPULT
RADM Nick Lambert, Maritime Domain Expert
UK technology innovation centre bringing together government, industry and academia to develop the future themes of the UK economy. In this case satellite applications. The Satellite Applications Catapult helps organisations make use of and benefit from satellite technologies, and bring together multi-disciplinary teams to generate ideas and solutions in an open innovation environment. Satellite Applications and the blue growth economy.

ORBCOMM
Greg Flessate, SVP & GM, Government and AIS
ORBCOMM is a leading global satellite data communications company focused on Machine-to-Machine (M2M) communications. The company’s satellite constellation includes spacecraft carrying Automatic Identification System (AIS) receivers, making ORBCOMM the first commercial service provider of globally collected AIS data from space. Technology Evolution vs. Requirements: The Role of Space Based Systems and AIS

SESSION CHAIR
Guy Thomas, C-SIGMA, President

Lunch
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EXACTEARTH

Graham Stickler, Vice President, Products and Services

exactEarth is a leading provider of global maritime vessel data for ship tracking and maritime situational awareness solutions.

Satellite AIS (S-AIS) has evolved rapidly not just as a global ship tracking method in itself but as an important component in a fused common operating picture of the maritime domain. This presentation will explore various initiatives, including new assets in space as well as corresponding advances in big data analytics and information creation, that moving forward look set to support a ‘golden age’ of maritime sensor fusion.

KONGSBERG SEATEX AS

Stig Erik Christiansen, Product Manager

Kongsberg Seatek is a leading provider of maritime electronics for ship and shore infrastructure, and have for more than 10 years developed receivers for Space AIS.

Kongsberg Seatek SAT AIS receivers are flying on several governmental and commercial satellites, including the International Space Station (ISS). The latest model of the SAT AIS receiver portfolio, the ASR X50, will be launched on NORSAT-1 in 2016. Kongsberg Seatek is also working with SAT VDES. VDES will support AIS and is an important element of the IMO e-navigation concept. A SAT VDES payload is being developed, and will fly on a satellite from Q4-2016.

SPIRE GLOBAL, INC.

Pierre-Damien Vaujour, Business Development Manager

Spire is a nanosatellite-powered data company that provides unique, near real-time data from any point on Earth.

Large constellations of multi-sensor nanosatellites are about to enable entirely new maritime domain awareness applications - from enhanced maritime surveillance using global near real-time AIS data to dark target recognition using imagery sensors collocated onboard the same spacecraft. Pierre-Damien Vaujour will provide insights into Spire’s data capabilities and how the company is building the world’s most resilient nanosatellite network.

URTHECAST

Dr. Nico Spyropoulos, Vice President Sales, Europe

UrtheCast-Deimos Imaging operates four space-based EO sensors, the Deimos-1 and Deimos-2 satellites and the ISS-based Medium Resolution Camera and High Resolution Camera HD video camera.

UrtheCast has recently announced that it is developing the world’s first commercial, fully-integrated constellation of multispectral optical and Synthetic Aperture Radar (SAR) satellites. The Constellation is expected to comprise a minimum of 16 satellites (8 optical and 8 SAR) flying in two orbital planes, with each plane consisting of four satellite pairs, equally-spaced around the orbit plane. All SAR satellites will carry sophisticated AIS sensors.

SESSION CHAIR

Rory Fitzpatrick, C-SIGMA, General Secretary

Coffee Break

Sponsored by
Session 8

CHANNEL LOGISTICS LLC
Capt Jatin S Bains, President
Channel Logistics, a US based technology company specializing in supply chain security for the maritime domain. The CATE System has been fielded for 10 years.
Numerous countries with large coastlines and no effective C4ISR capability will now benefit from the Low Orbit Satellite revolution offering remote sensing operational capability. This presentation will demonstrate how LEO satellites with diversified sensor payloads can deliver the near real time operational capability using CATE, a BIG DATA analytic system. This paper will provide a deconstruct, how LEO satellite data used with CATE are well positioned to provide supply chain security in the maritime domain.

GLOBAL FISHING WATCH
Global Fishing Watch, Partners
Global Fishing Watch is a technology platform that uses satellite data to inform the public about over-fishing and make global fishing activity more transparent.
Global Fishing Watch is the product of a technology partnership that is designed to show all of the track-able fishing activity in the ocean. This interactive web tool – currently in prototype stage – is being built to enable anyone to visualize the global fishing fleet in space and time. Global Fishing Watch will reveal the intensity of fishing effort around the world, one of the stressors contributing to the precipitous decline of our fisheries.

A-T SOLUTIONS, INC
Paul Kerstanski, VP Worldwide Maritime
PAE is a leading provider of enduring support for the essential missions of the U.S. government, its allied partners and international organizations. In its 60th year of business, PAE provides services in aviation, capacity building and stabilization, critical infrastructure, expeditionary logistics, identity and information management solutions, integrated security solutions, test and training ranges, and training solutions to support the complex missions of our customers around the world. PAE has a workforce of approximately 15,000 people in over 50 countries and is headquartered in Arlington, VA.
The presentation will focus on Data Fusion.

SESSION CHAIR
Rory Fitzpatrick, C-SIGMA, General Secretary

C-SIGMA OVERVIEW & CLOSING

Adjourn

www.c-sigma.org
Visit to Greenwich

Visit to Royal Greenwich Observatory and Maritime Museum. No booking required.
Meet at Maritime Museum at 10.30am.
Greenwich Royal Observatory and Maritime Museum are located a short walk from the Cutty Sark river taxi stop.

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