Civil Security from Space

esa

Europe is facing a set of expanding, evolving civil security challenges and inter-connected crises

There is a need to enhance the means to act for European citizens' security



Christopher Topping

- Earth Observation Directorate

Gordon Campbell

- Laitii Observation Directorate

Pascal Legai

Senior Security Adviser to ESA Director General

- Telecoms & Integrated Application Directorate

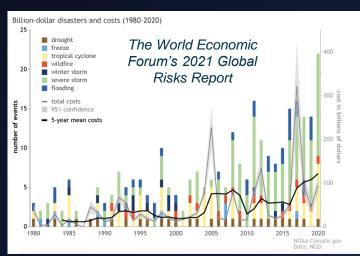
Crisis and Civil Security Events are Escalating





Climate Induced Crises





German floods: Up to €30 billion needed for recovery fund

North Rhine-Westphalia State Premier Armin Laschet said at least €13 billion would be needed in his state alone. Over 180 people died in last month's natural disaster.

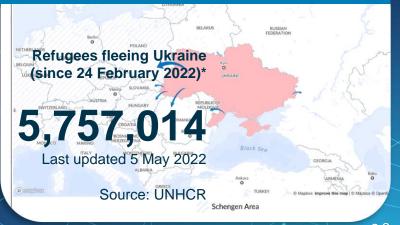
Cyber Crime

Cybercrime is predicted to inflict damages totaling \$10.5 trillion globally in 2025 source Cybersecurity Ventures

Climate Induced Crises



Geopolitical Instability



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Faster responses to civil security & crises events save lives and reduce costs





Every minute reduction in response time results in:



8 - 17% decrease in overall mortality rates in the population

5.5% decrease in health care costs for patients with severe trauma

\$2,700 - \$6,000 reduction in infrastructure damage costs (from fires)

Mortality

Morbidity

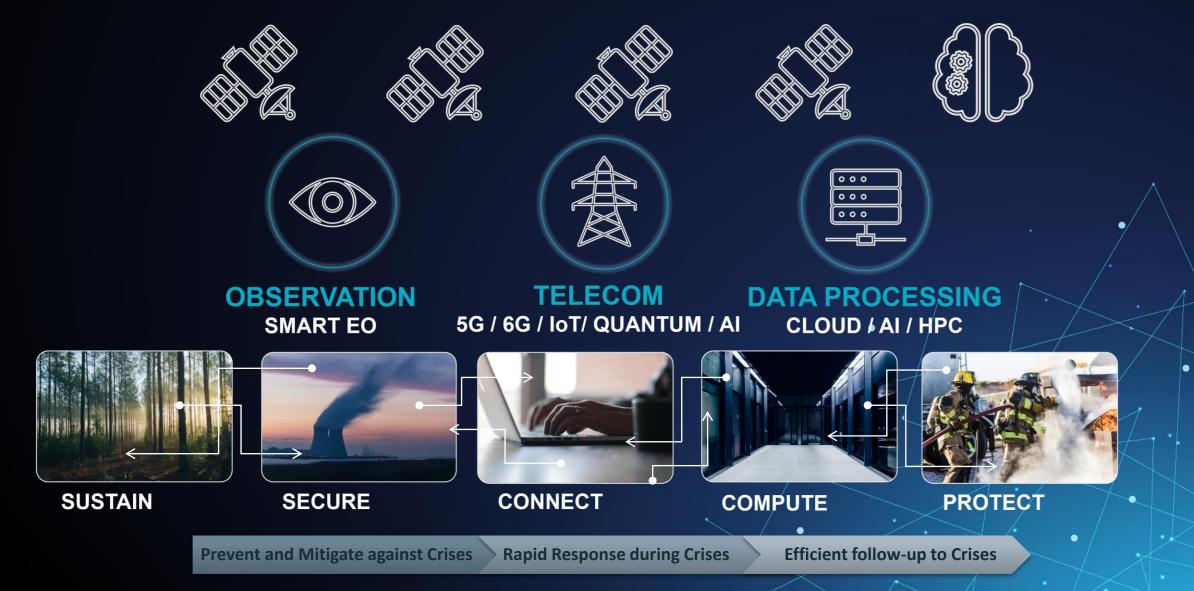
healthcare costs

Property damage costs

Lives lost in disaster directly correlate with response time.

Civil Security & Crisis Response: The Solution



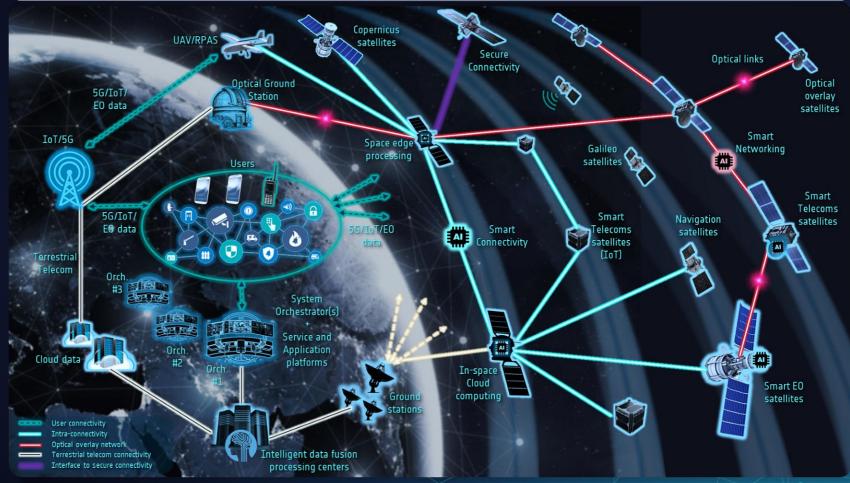


Vision 2035 - A Federation of Systems





A UNIFIED, SECURE, RESILIENT, RESPONSIVE AND SMART NETWORK



Core Elements – CSS Development Opportunities



EO small sats and HAPS

- Smart MEO/LEO/HAPS solutions
- With edge-processing
- With tipping and queuing capabilities

In-situ sensory data collection platforms

- Smart LEO/HAPS solutions with edge-processing capabilities for ubiquitous and rapid data collection
- Seamless handling of terrestrial and space based 5G and IoT data sets

service layer

em federation la

User Applications



Customised to each user needs

Interconnectivity



Data Fusion & Analytics

Service platforms

IoT Sensor Data

Earth Observation Data

- End user service delivery platforms for hosting applications
- · Resilient service guarantee
- Multi-use
- Customised to use-case needs

computing platforms, data visualisation and analysis engines

- In-space and on-ground data processing
- Generation of actionable information using AI
- · Provide crisis characterisation
- · Offer User interactivity

High performance

Smart communications network

- Fully integrated and smart communications infrastructure
- Offered with GEO/LEO satellites and accompanying ground segment
- Fast transfer of data
- Flexible and scalable connectivity
- Enables seamless integration to ground assets
- · Assured data integrity

Orchestration platforms

- System of systems coordination offering agnostic data exchange
- Operations capabilities for seamless tasking of R3 assets
- Customised to user needs

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Developing CSS – Underpinned by Collaborations



Commercial undertakings

National Programmes

EU Programmes

ESA Programmes

Other seed activities and building blocks

Civil Security from Space Programme (CSS) is a New Programme subscribed at CM22

CSS is also a major contributing programme to the R3 Accelerator

Seeking Collaborations – CSS Partners



Mechanisms

- Partnership Projects
- User Consultation Group
- Industry Association
- Collaboration Agreements
- Innovative Funding Schemes 3rd party funds

- Capabilities build-up
- Demand lead
- Industry lead
- 3rd party seeds
- Ord north funda

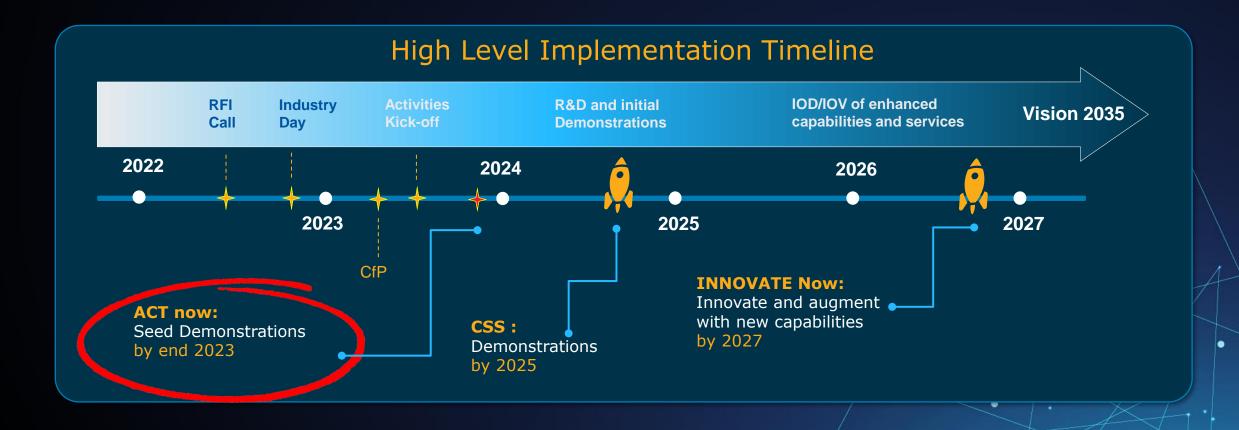


Invitation to join as CSS Programme Partner

Contact CSS team – registration process to open end of March

CSS - Incremental Development & Demonstration Plan





Deliver trials, demonstrations (IOD/IOV) & support the preparation of service capabilities to a set of crisis and civil security actors

CSS High Level Planning – Initiating Projects



Shape	Shape industry RFI proposals into Partnership Projects / Product Activities	
+		
Invite	Expressions of Interest (EoI) in Feb/Mar 2023 to open for new proposals	
+		
Consolidate	Consolidate discussed projects and prepare industry for call	
Consult	Consult with Member State Delegations on proposed opportunities	
Prepare	Prepare Call for Proposals (CfP) inline with stakeholder interests	
Issue	Issue CfP March 2023	
Place	Place contracts starting end of Q2 2023	
	- Lander Company of the Company of t	

Proposals Preparation & Contract Placement steps



Expressions of Interest in Jan/Feb

Call for Proposals in March

Contract placements from July

- Outline proposals of proposed projects – Business case, scope, partners, development plan, costs
- Ensure the eligibility of the activities is aligned with programme perimeter
- Allow for early discussions with Member State Delegations on scope and costs

- Full Proposals of proposed projects -Elaborated Outline Proposals – detailed financials and activities descriptions.
- Responding to either Partnership or Product proposal templates – agreed at Outline proposal step
- Subject to support from Delegations if to proceed to this step

- Subject to successful evaluation, proceed to negotiations
- Subject to successful negotiations proceed to contract placement



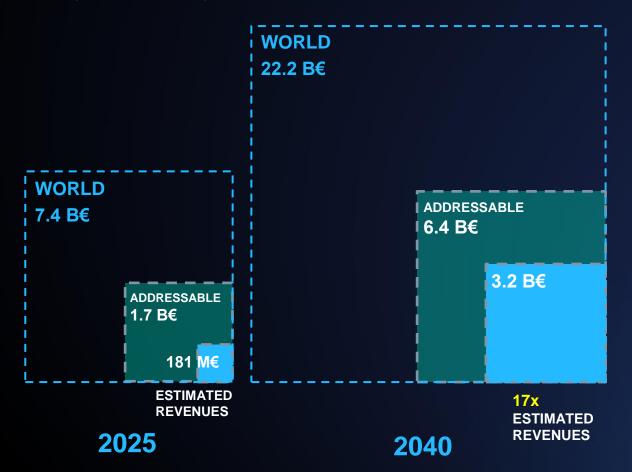


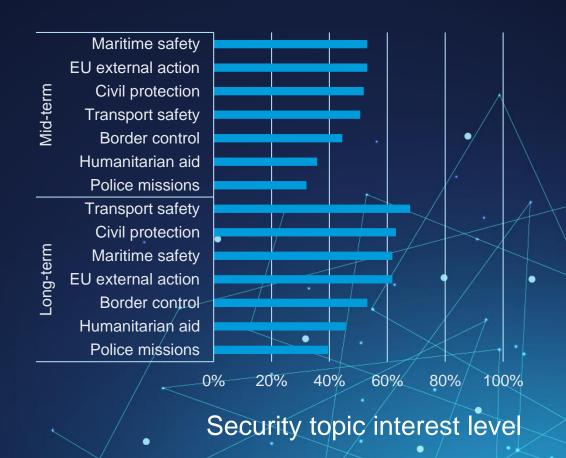


Safety & Security – 17x Market Potential by 2040



Safety & Security related Market Sizes



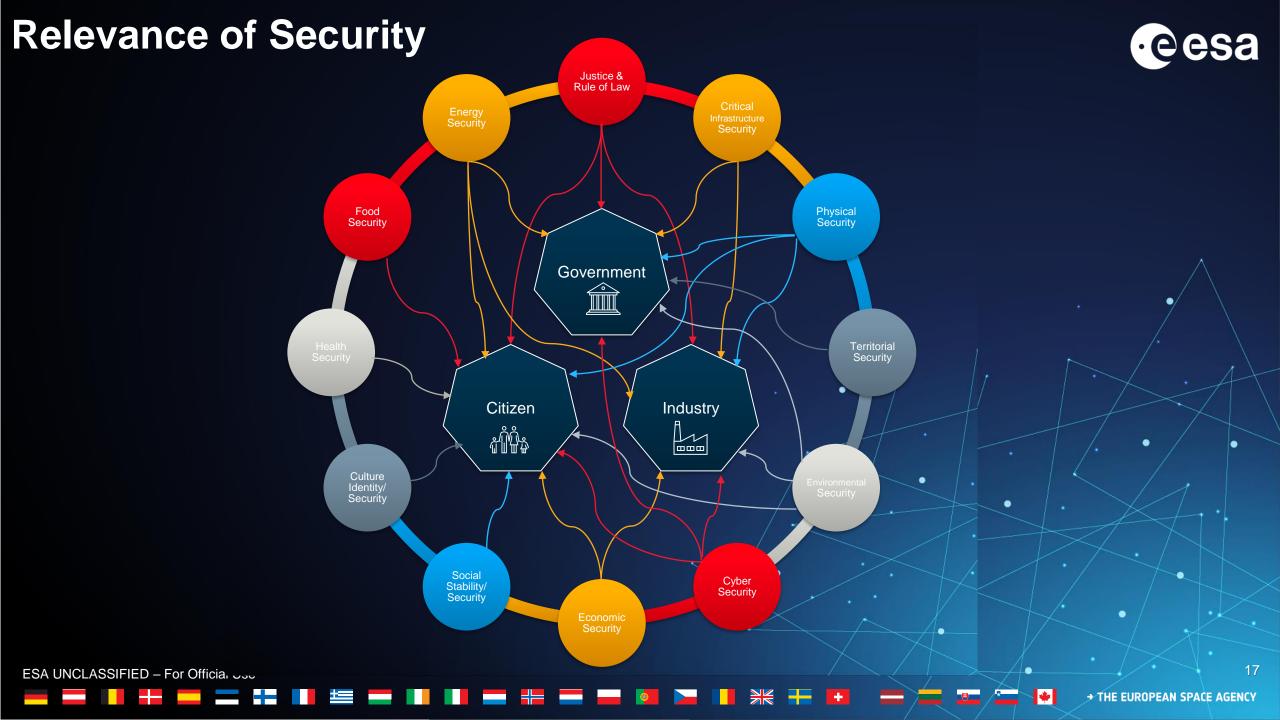


Civil Security from Space – Portfolio of use-cases



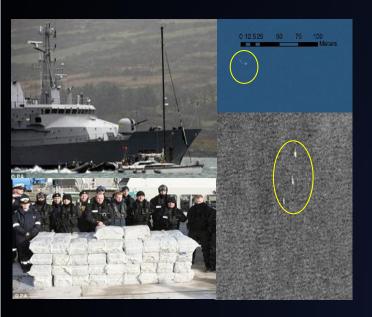
Example of mission	Categories	Crisis Events	
Maritime Community	Maritime Search & Rescue		Floods
	Response to maritime disasters (pollution, oil spill, etc.)		Forest fi
	Response to illegal fishery activities	Natural disaster	Landslic
Humanitarian Aid	response to megal hanery activities		Hurricar
	Humanitarian aid assistance in case of natural or man-made disasters		Earthqua
	Humanitarian aid assistance in case of non-international conflicts		Tsunam
	Humanitarian Telemedicine		Volcanio
Civil protection		Technological	Oil Spill
	Deployment of Civil Protection teams / modules in case of natural or man- made disasters		Industria
	Civil protection ambulance and fire&rescue response on MS territories		Transpo
Crime	Oivii protection ambulance and mediescue response on MS territories	Man-made crisis Cyt	Piracy
	Fight against international drug traffic with EU MS areas of jurisdiction		Humani
	Fight against international Crime Groups and illegal activity		Cyberat
	National Police mission within EU territories		Terrorisi

Crisis Events			
	Floods		
	Forest fires		
	Landslides		
Natural disaster	Hurricane and storms		
	Earthquakes		
	Tsunamis		
	Volcanic eruptions		
	Oil Spill and spill accidents		
Technological Disaster	Industrial accidents		
	Transport accidents (air, rail, sea)		
	Piracy		
Man-made crisis	Humanitarian crisis		
	Cyberattack		
	Terrorism		



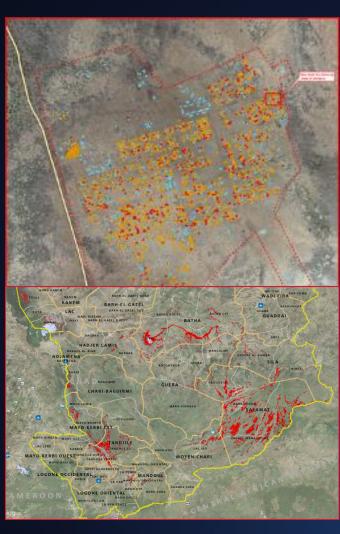
Examples of Civil Security Applications





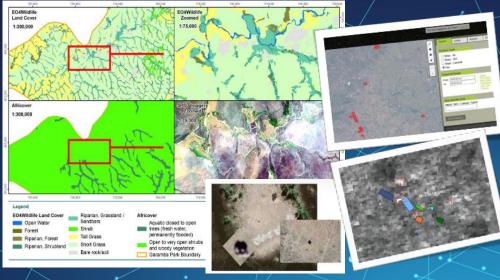


Maritime security



Humanitarian response to onset of crises



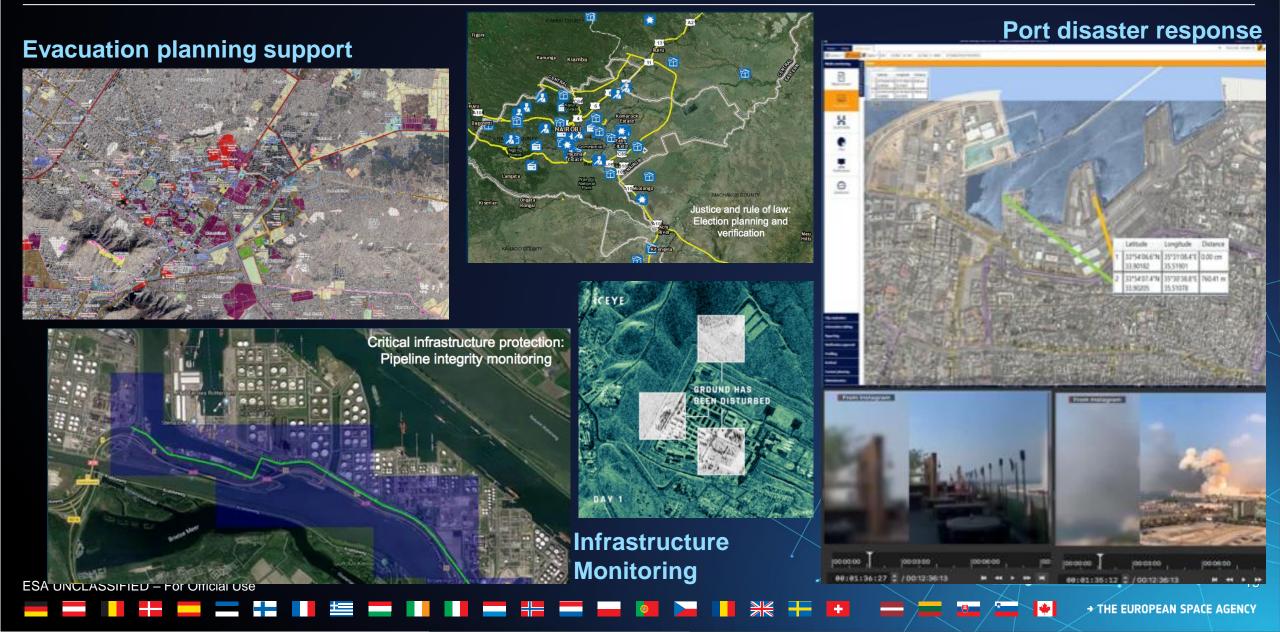


Environmental crime

Examples of Civil Security Applications

Critical infrastructure, damage assessment, response planning





New Developments needed





New instruments & information

- Hyperspectral imagery
- SAR/Optical/IR video
- Long wavelength SAR
- RF Signal detection
- loT sensor networks & transponders

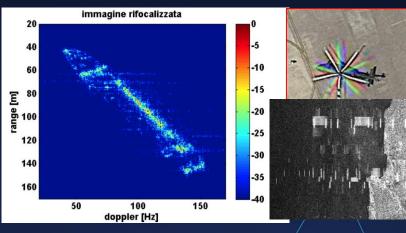
New processing methods for expanded information content, e.g.:

- ISAR/Multi-Static SAR
- Parallax exploitation
- Super-resolution enhancement
- Noise characterisation



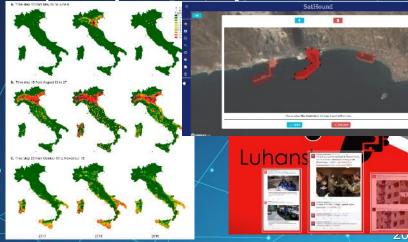
Al enabled/enhanced capabilities

- Feature detection/identification/ characterisation
- Heterogeneous data fusion
- Inference & prediction



New systems enabling enhanced:

- Persistence
- Responsiveness & latency
- Adaptability & flexibility



New tools and methods



Organized crime

+

Terrorism



Climate change



Social & demographic change

Proliferation

Crimes against humanity

Environmental Crime

Trafficking

Threats to critical infrastructure

Displacement & migration

Loss of resources

Fragility & onset of violence

Situation Awareness:

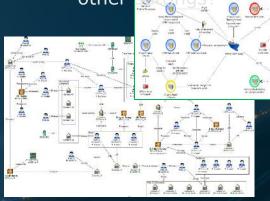
- What happened?
- Where?
- Extent & impact?
- Consequences
- Response options & priorities

Context - eg:

- What anomalies are detectable?
- What else has happened & where?
- What is happening in potentially connected situations?
- Social media sentiment and reaction?

Understanding of underlying process:

- How was the situation generated?
- What were the key contributing factors?
- Where are we seeing signals of these factors in other other



Service and Applications Platforms



Secure ICT environment



Stakeholder specific analytics & orchestration platforms

Tasking
Discovery
Activation
Orchestration
Work flow customisation

Data/information Forecast/Inference Analysis & Indicators Warning/notification

- ✓ Big data analytics
- ✓ Multi-data fusion
- ✓ Al decision support tools (inference, anomaly, correlation etc)
- ✓ Flexible, adaptable workflow creation
- ✓ New data collection tasking
- ✓ AR/VR visualisation



Al processing/ enhancements/ fusion



Innovative data processing/ visualisation



Customised fast Databases ARD structures etc.



High performance processing Rapid connectivity etc

tasking

data

tasking

data

tasking

data

E ANS

tasking

data

NewSpace, Commercial & National Capabilities EO, IoT, etc.

Non-space data collection & connectivity platforms

UAVs etc

Commercial OSINT

> loT Sensor

Networks

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ESA UNCLASSIFIED – For Official Use