

ESA's Digital Agenda

European Interparliamentary Space Conference

Dr. Bianca Hoersch, Chief Digital Officer

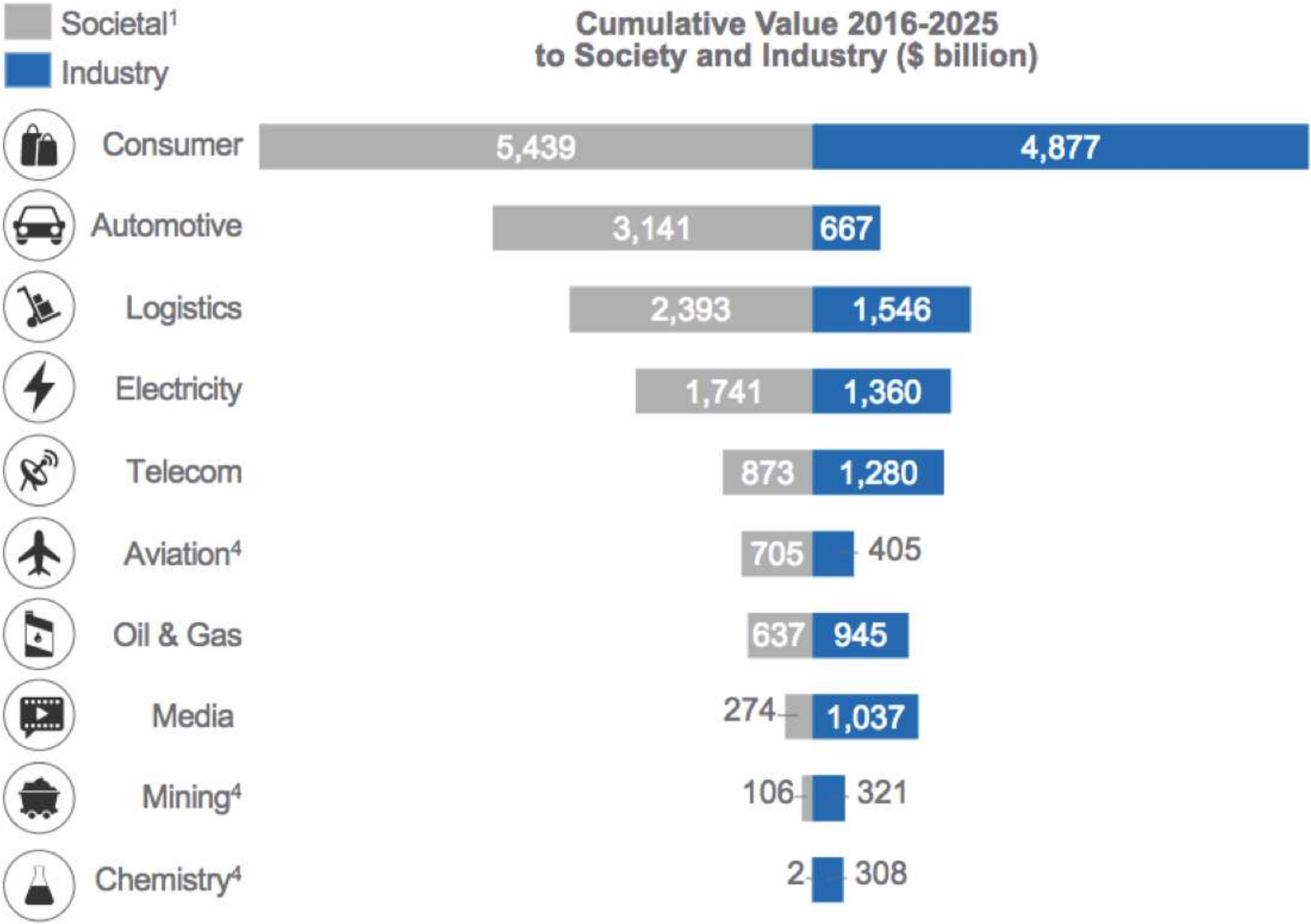
14 May 2018

Shift of paradigms!

Change of

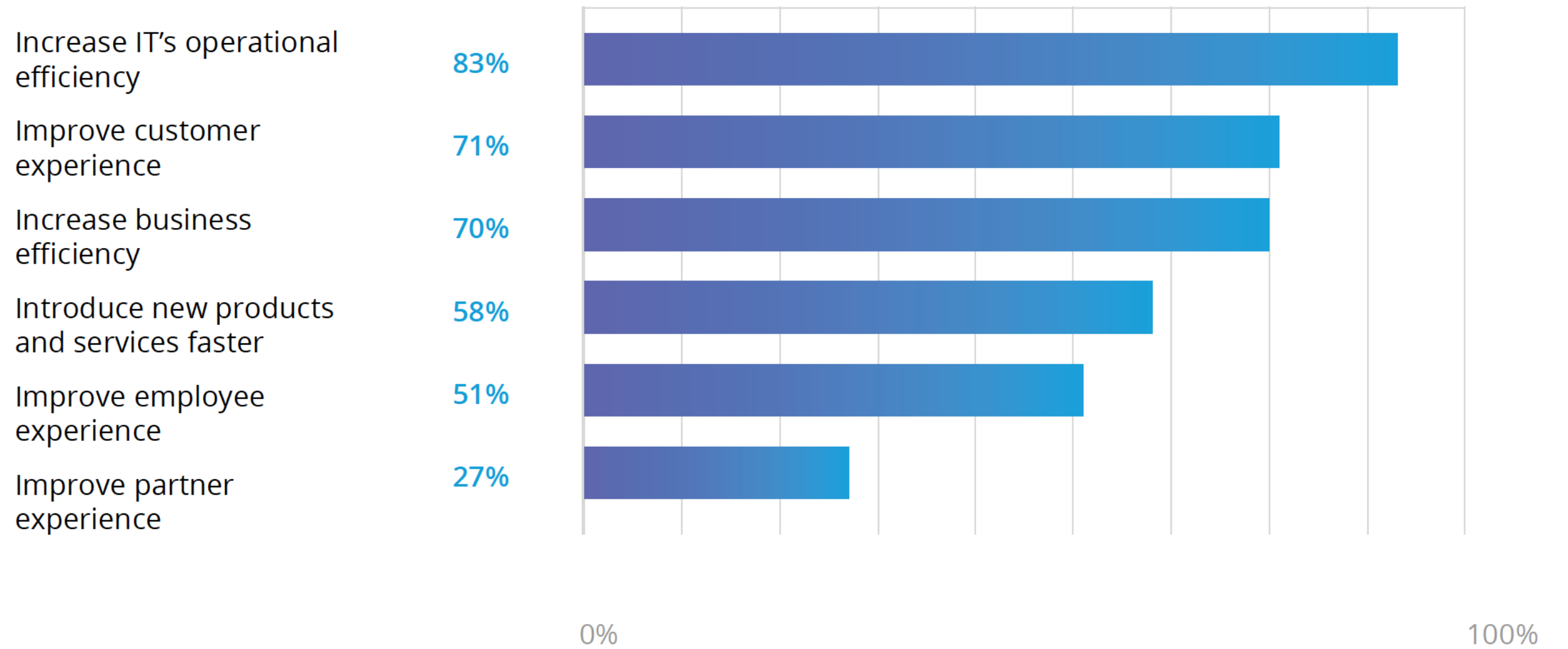
- Motivations
- Actors
- Contents
- Roles
- Technologies

- Commercialisation
- spin in / spin off
- Participation
- Diversity
- Information
- Innovation
- Interaction
- Inspiration
- Cooperation
- Jobs & growth
- **Digitalisation**



\$100 Trillion in
Digital
Transformation

GAIN (2)   Increase Efficiency



Mulesoft Connectivity Benchmark Report 2018



1. Information Management, Sharing & Protection



2. Industry collaboration/New business models



3. Evolution of work-environment intern & extern, workforce & culture

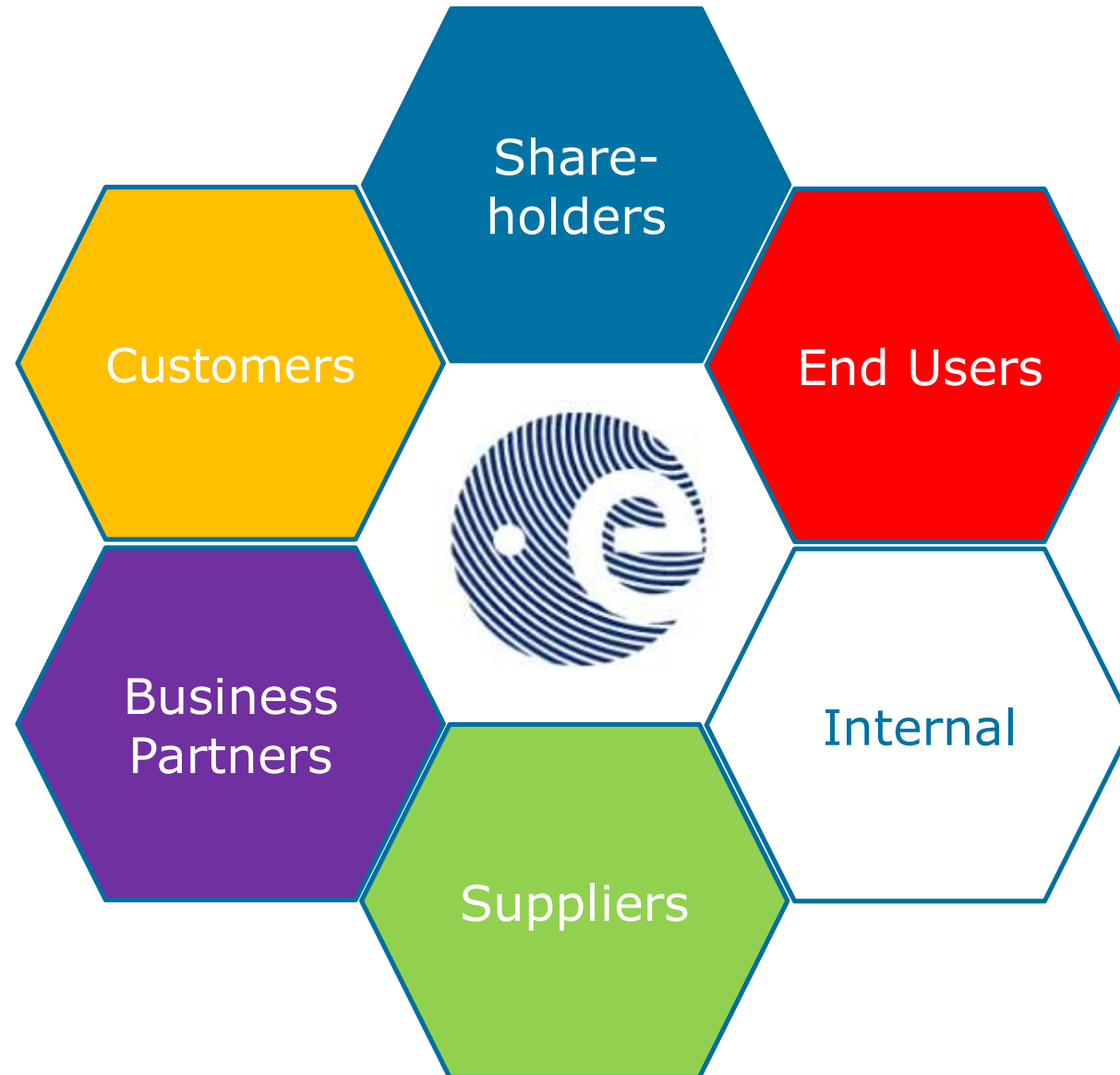


4. Innovation & Technology

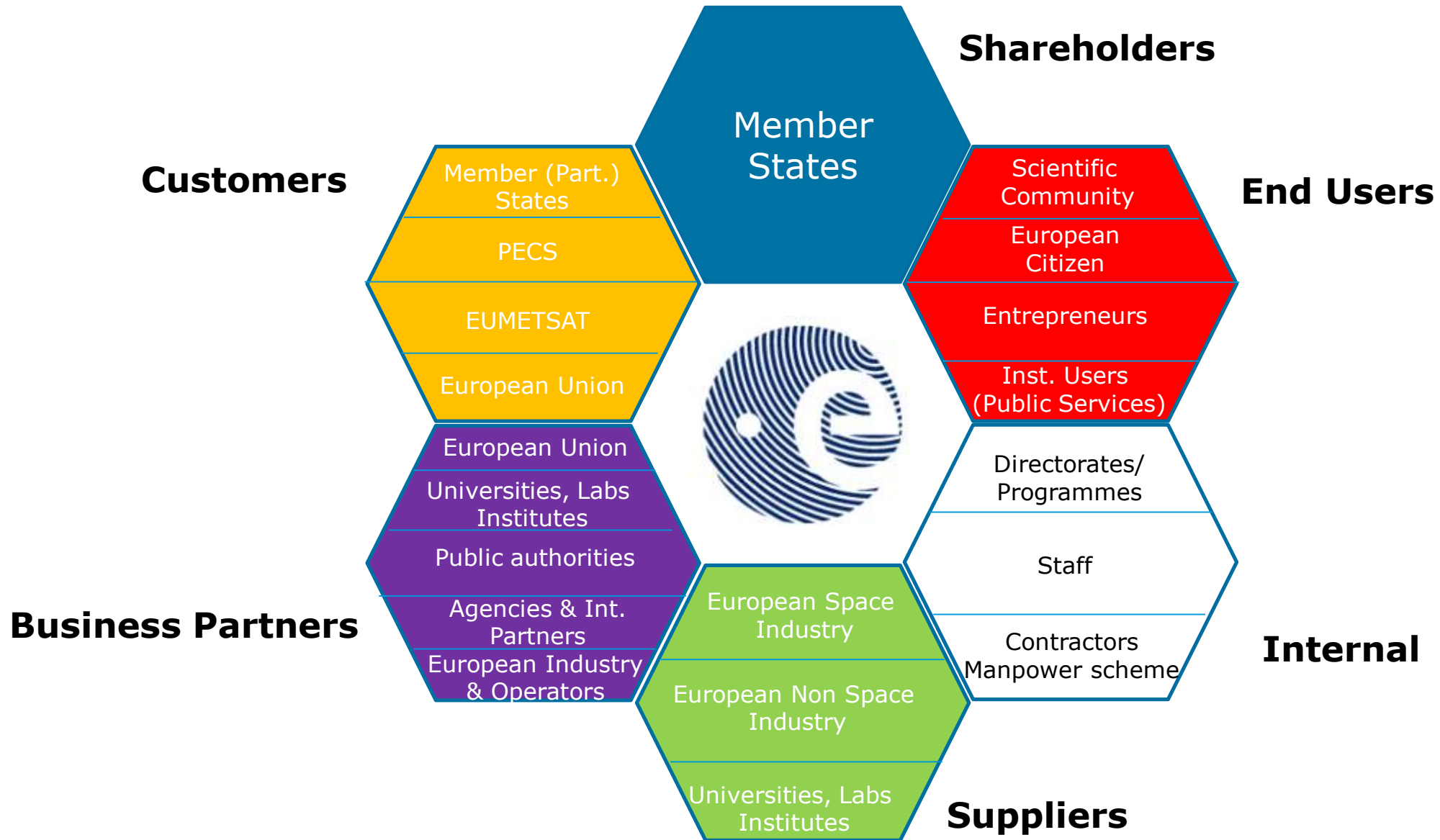


1. Information Management, Sharing & Protection

Who are ESA's Interested parties?



ESA's Interested parties (2)



What do they get from ESA?

Space Data	Instrument Data (all processing levels)
	Aux-, Telemetry campaign- or test- or validation data
	Campaign data
	Value-added products
	PR Space Imagery, Fotos etc.
SW & IT Tools	Software
	Managem. Inform. Systems
	Technical Inform. Systems
ESA Technical Info (under ESA contract)	SoW, Technical documents, plans, porcedures
	Internal Problem Notifications (IPNs); audit reports
	ESA Study results
	Technical Test Results
	Patents
	Market assessments/ Reports
	Presentations, & Journal papers by ESA staff

Industry Techn. Info	Industry's technical proposals
	Progress reports and technical analysis
	Programme and project documentation by industry, technical design information.
	Patents & IPRs registered resulting from ESA contracts
Scientific Info	Scientific proposals on ESA calls and progress reports.
	Scientific studies, assessments and analysis
	Scientists' data quality reports, or data exploitation results.
	Processing algorithms and their documentation
ESA Management Information	Of ESA's Internal Business (Finance, HR, Audits, QMS, Admins)
	Of Space Business(Finance, Declarations, Reports, Procurement, Programs)
Personal Data	Of and about ESA Staff
	Of and about non-ESA staff ESA

ESA/IPC(2017)41: ESA Digital Agenda Information Management Principles

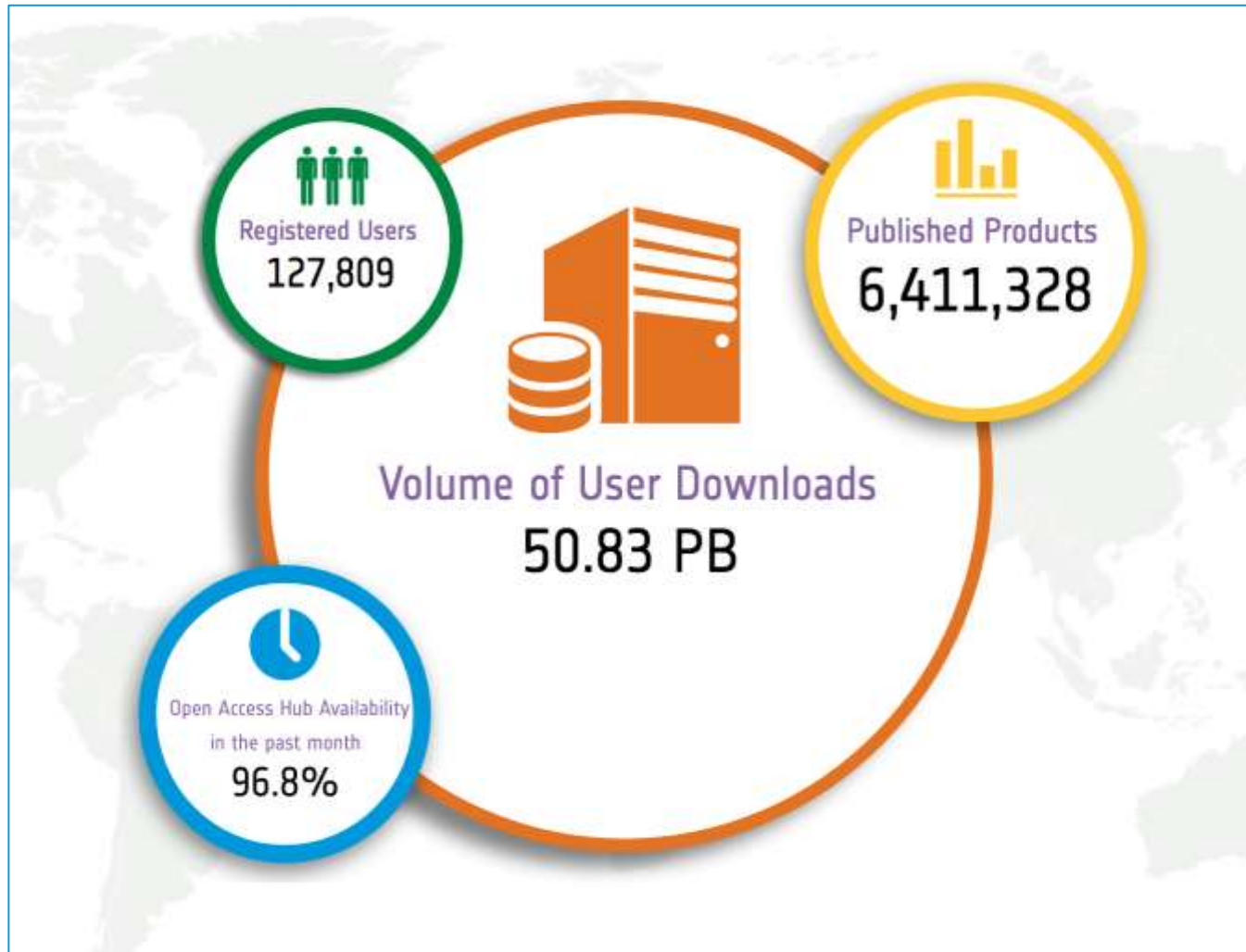
Information & Data Matrix [UNCLASSIFIED]		ESA Executive			Member States				Customers Third Parties (funding)			Cooperating Partners (Agreements)			Space Industry				Non-space Industry		Science		Education		General Public	
		Limited ESA Staff											To WHOM?													
		All ESA staff	ESA staff & contractors		Selected Delegates	Accredited Delegates	MS's Space Agencies	MS's national public use	EU/EC	Eumetsat	Others	International Organisation	International (Space) partners	Instrument Providers /Recipients	Large Space Industry /MS	Indust. with ESA bid or contract	Industry subgroup (SME)	Non MS Space Industry	Non-space Industry large	Non-space Industry SME	ESA accepted projects /teams & PIs	Any research	Primary & Secondary education	Space Experts	Citizen	
Space Data	Instrument Data (all processing levels)	A1	A2	A3	A4	A5	A6	A7	A8	A9	A10	A11	A12	A13	A14	A15	A16	A17	A18	A19	A20	A21	A22	A23	A24	
	Aux-, Telemetry campaign- or test- or validation data	B1	B2	B3	B4	B5	B6	B7	B8	B9	B10	B11	B12	B13	B14	B15	B16	B17	B18	B19	B20	B21	B22	B23	B24	
	Campaign data	C1	C2	C3	C4	C5	C6	C7	C8	C9	C10	C11	C12	C13	C14	C15	C16	C17	C18	C19	C20	C21	C22	C23	C24	
	Value-added products	D1	D2	D3	D4	D5	D6	D7	D8	D9	D10	D11	D12	D13	D14	D15	D16	D17	D18	D19	D20	D21	D22	D23	D24	
	PR Space Imagery, Fotos etc.	E1	E2	E3	E4	E5	E6	E7	E8	E9	E10	E11	E12	E13	E14	E15	E16	E17	E18	E19	E20	E21	E22	E23	E24	
SW & IT Tools	Software	F1	F2	F3	F4	F5	F6	F7	F8	F9	F10	F11	F12	F13	F14	F15	F16	F17	F18	F19	F20	F21	F22	F23	F24	
	Managem. Inform. Systems	G1	G2	G3	G4	G5	G6	G7	G8	G9	G10	G11	G12	G13	G14	G15	G16	G17	G18	G19	G20	G21	G22	G23	G24	
	Technical Inform. Systems	H1	H2	H3	H4	H5	H6	H7	H8	H9	H10	H11	H12	H13	H14	H15	H16	H17	H18	H19	H20	H21	H22	H23	H24	
ESA Technical Info (under ESA contracts)	SoW, Technical documents, plans, porcedures	I1	I2	I3	I4	I5	I6	I7	I8	I9	I10	I11	I12	I13	I14	I15	I16	I17	I18	I19	I20	I21	I22	I23	I24	
	Internal Problem Notifications (IPNs); audit reports	J1	J2	J3	J4	J5	J6	J7	J8	J9	J10	J11	J12	J13	J14	J15	J16	J17	J18	J19	J20	J21	J22	J23	J24	
	ESA Study results	K1	K2	K3	K4	K5	K6	K7	K8	K9	K10	K11	K12	K13	K14	K15	K16	K17	K18	K19	K20	K21	K22	K23	K24	
	Technical Test Results	L1	L2	L3	L4	L5	L6	L7	L8	L9	L10	L11	L12	L13	L14	L15	L16	L17	L18	L19	L20	L21	L22	L23	L24	
	Patents	M1	M2	M3	M4	M5	M6	M7	M8	M9	M10	M11	M12	M13	M14	M15	M16	M17	M18	M19	M20	M21	M22	M23	M24	
	Market assessments/ Reports	N1	N2	N3	N4	N5	N6	N7	N8	N9	N10	N11	N12	N13	N14	N15	N16	N17	N18	N19	N20	N21	N22	N23	N24	
	Presentations, & Journal papers by ESA staff	O1	O2	O3	O4	O5	O6	O7	O8	O9	O10	O11	O12	O13	O14	O15	O16	O17	O18	O19	O20	O21	O22	O23	O24	
Industry Techn. Info	Industry's technical proposals	P1	P2	P3	P4	P5	P6	P7	P8	P9	P10	P11	P12	P13	P14	P15	P16	P17	P18	P19	P20	P21	P22	P23	P24	
	Progress reports and technical analysis	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	
	Programme and project documentation by industry, technical design information.	R1	R2	R3	R4	R5	R6	R7	R8	R9	R10	R11	R12	R13	R14	R15	R16	R17	R18	R19	R20	R21	R22	R23	R24	
	Patents & IPRs registered resulting from ESA contracts	S1	S2	S3	S4	S5	S6	S7	S8	S9	S10	S11	S12	S13	S14	S15	S16	S17	S18	S19	S20	S21	S22	S23	S24	
Scientific Info	Scientific proposals on ESA calls and progress reports.	T1	T2	T3	T4	T5	T6	T7	T8	T9	T10	T11	T12	T13	T14	T15	T16	T17	T18	T19	T20	T21	T22	T23	T24	
	Scientific studies, assessments and analysis	U1	U2	U3	U4	U5	U6	U7	U8	U9	U10	U11	U12	U13	U14	U15	U16	U17	U18	U19	U20	U21	U22	U23	U24	
	Scientists' data quality reports, or data exploitation results.	V1	V2	V3	V4	V5	V6	V7	V8	V9	V10	V11	V12	V13	V14	V15	V16	V17	V18	V19	V20	V21	V22	V23	V24	
	Processing algorithms and their documentation	W1	W2	W3	W4	W5	W6	W7	W8	W9	W10	W11	W12	W13	W14	W15	W16	W17	W18	W19	W20	W21	W22	W23	W24	
ESA Management Information	Of ESA's Internal Business (Finance, HR, Audits, QMS, Admins)	X1	X2	X3	X4	X5	X6	X7	X8	X9	X10	X11	X12	X13	X14	X15	X16	X17	X18	X19	X20	X21	X22	X23	X24	
	Of Space Business(Finance, Declarations, Reports, Procurement, Programs)	Y1	Y2	Y3	Y4	Y5	Y6	Y7	Y8	Y9	Y10	Y11	Y12	Y13	Y14	Y15	Y16	Y17	Y18	Y19	Y20	Y21	Y22	Y23	Y24	
Personal Data	Of and about ESA Staff																									

To WHOM?

Who in ESA?
By which tool & process?
Protected how?

ESA/IPC(2017)41: ESA Digital Agenda Information Management Policy Principles

e.g. Online Dashboards: Statistics on Copernicus Mission Exploitation



Information to Customer &
Business Partner:
European Union



2. (Non-space) Industry collaboration

New business models for Space



ActInSpace

May 25th. 26th 2018

24h To find **answers** to **tomorrows needs** by
inventing new uses and **services** derived from
space technology

In **HUB31**, Hilpertstraße 31, Darmstadt
Register now: <https://actinspace.org/register>

Shall we build a European Kaggle?

Featured Prediction Competition

Statoil/C-CORE Iceberg Classifier Challenge

Ship or iceberg, can you decide from space?

Statoil

\$50,000
Prize Money

Statoil · 3,343 teams · 2 months ago

Data and Remote Sensing
expertise provided by
C-CORE

Overview

Data

Kernels

Discussion

Leaderboard

Rules

Overview

Description

Background

Evaluation

Prizes

Timeline

Drifting icebergs present threats to navigation and activities in areas such as offshore of the East Coast of Canada.

Currently, many institutions and companies use aerial reconnaissance and shore-based support to monitor environmental conditions and assess risks from icebergs. However, in remote areas with particularly harsh weather, these methods are not feasible, and the only viable monitoring option is via satellite.

Statoil, an international energy company operating worldwide, has worked closely with companies like **C-CORE**. C-CORE have been using satellite data for over 30 years and have built a computer vision based surveillance system. To keep operations safe and efficient, Statoil is interested in getting a fresh new perspective on how to use machine learning to more accurately detect and discriminate against threatening icebergs as early as possible.

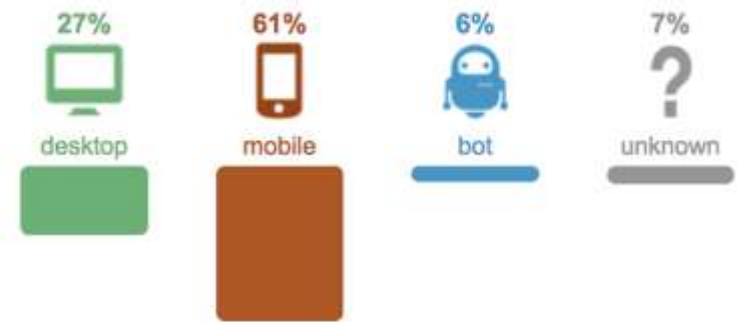
In this competition, you're challenged to build an algorithm that automatically identifies if a remotely sensed target is a ship or iceberg. Improvements made will help drive the costs down for maintaining safe working conditions.





3. Evolution of work-environment intern & extern, workforce & culture

21,159,958 reach



e.g. New working environment & tools

INTERVIEW | SCIENCE | SPACE

Astronaut Samantha Cristoforetti on tweeting from space and brewing the first zero-g espresso

'Space chose me as opposed to me choosing space'

By Alessandra Potenza | @ale_potenza | May 14, 2017, 11:00am EDT



Samantha Cristoforetti, an Italian astronaut with the European Space Agency, in 2015. | Photo: ESA / NASA



You're quite popular for your social media posts from space. I was wondering, when you're up on the ISS, how do you decide what to post?

One thing I did is pictures, so nice things you see from the window that you can take a picture of and you post it, and that's usually what attracts the most attention on social media. And then there are the other things which require a little bit more work, although they actually attract less attention, which is reporting what you actually do. In fact, for at least the first half of one of my missions I made it a point to post almost daily blogs describing the experiments that I was doing and the different activities, although I decided they do not attract half as much attention as my pictures, unfortunately. But I did feel committed to not only share pictures but actually also content on what I was doing, so I tried to do that as

ROMA VITERBO RIETI LATINA FROSINONE ABRUZZO MARCHE UMBRIA

HOME PRIMO PIANO ECONOMIA SPETTACOLI E CULTURA SOCIETÀ SPORT

Il Messaggero > Tecnologia > Scienza

cerca nel sito...

Samantha Cristoforetti abbandona Facebook: «Mi sento a disagio ad attirare utenti su questa piattaforma»

5

f

t

g+

Print



di Enzo Vitale

Stavolta le scuse di Zuckerberg non sono bastate. Evidentemente deve averla fatta parecchio grossa visto che anche Samantha Cristoforetti, l'astronauta dell'Esa, ha deciso di prendersi una pausa da Facebook.



Samantha Cristoforetti

about a month ago



Dear reader,

I am discontinuing the update of this Facebook page at this time. I have grown uncomfortable with the idea of contributing to draw users to this platform. My contribution is extremely small, but it is mine and I feel responsible for it.

It is still unclear what... See April 11, 2018

and to what... See April 11, 2018

How to turn Facebook into a weaponised AI propaganda machine



Social media can influence how you vote
Jaap Arriens/NurPhoto/Getty



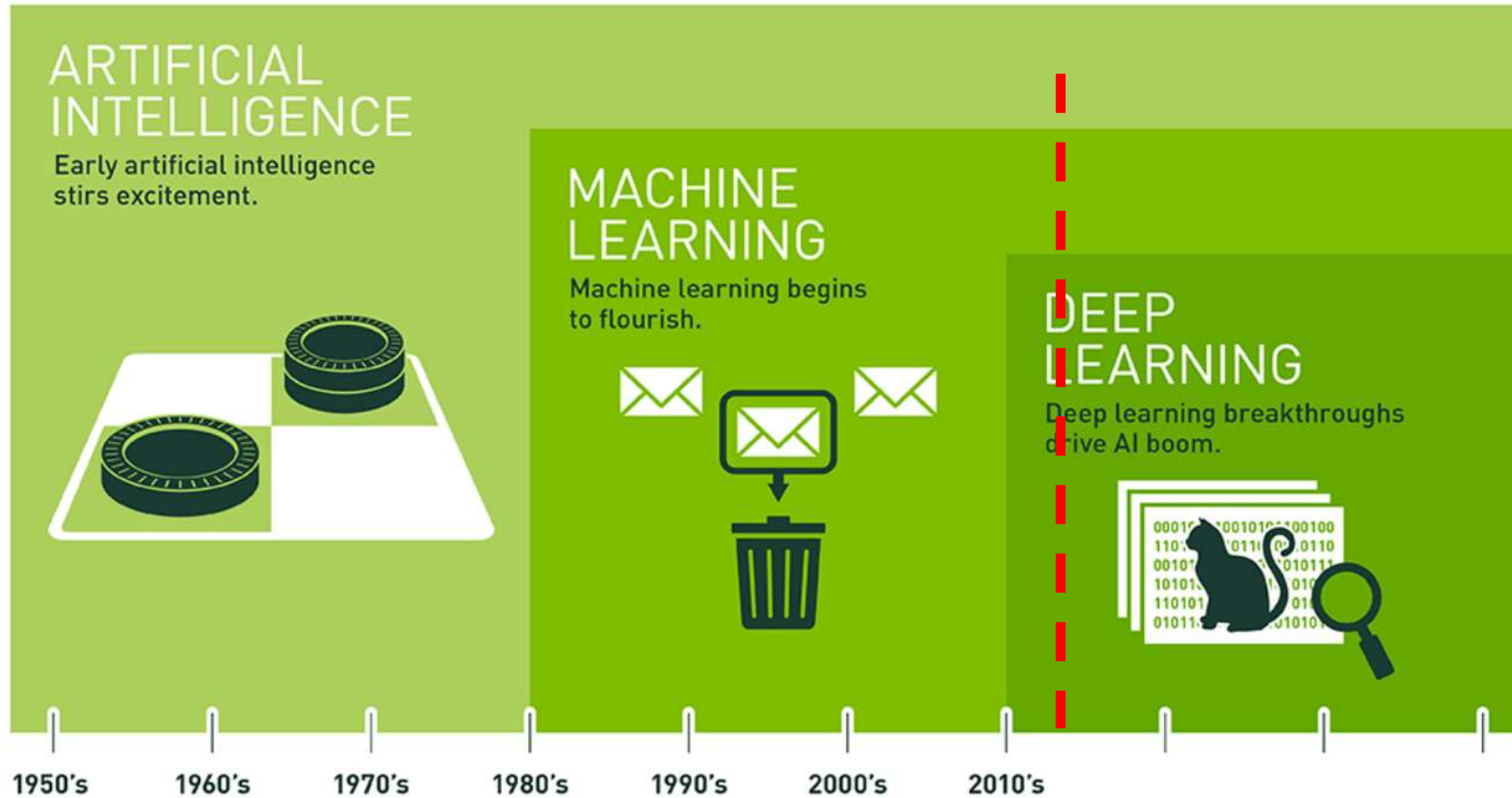
4. Innovation & Technology

- a) Science & Research
- b) Technical disruptions
- c) ICT technologies



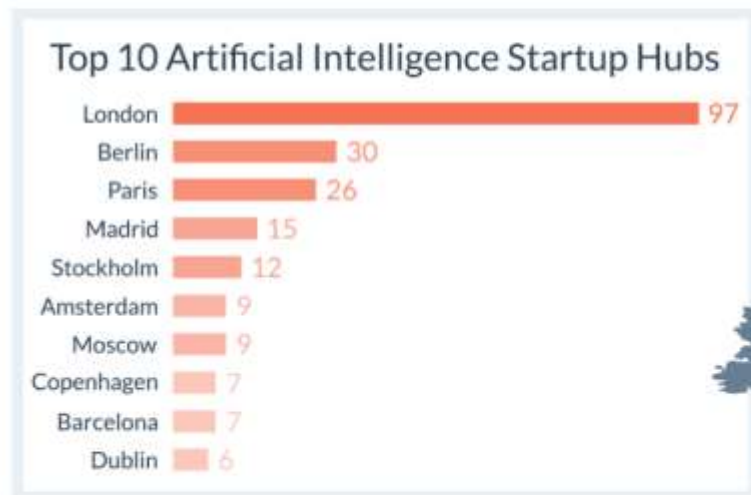
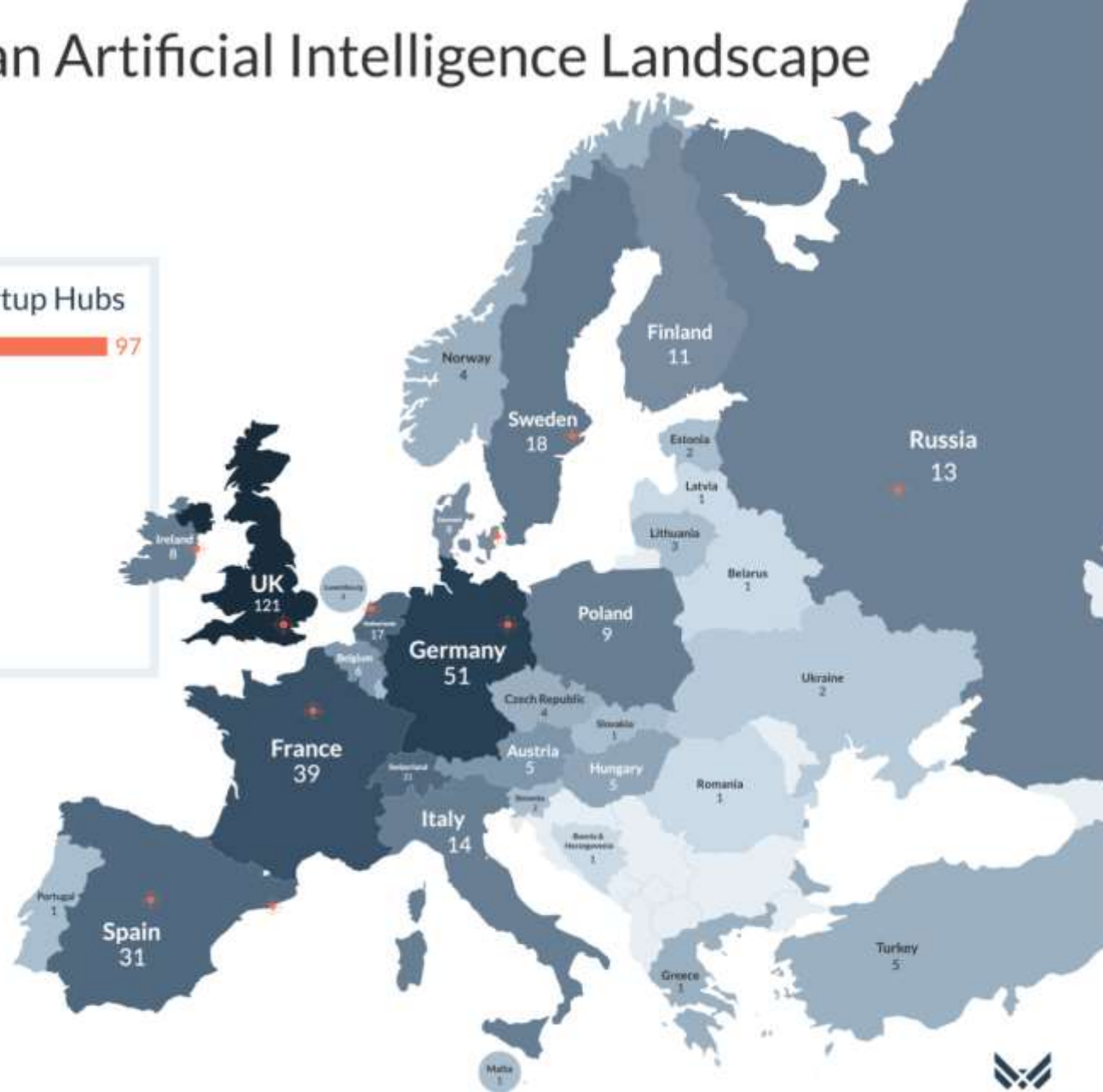
ESA/C(2016)108_ESA's Digital Agenda for Space

e.g. Artificial Intelligence



Since an early flush of optimism in the 1950s, smaller subsets of artificial intelligence – first machine learning, then deep learning, a subset of machine learning – have created ever larger disruptions.

The European Artificial Intelligence Landscape



Artificial Intelligence in Member States: Digital Agenda of Member States



	AU	BE	CH	CZ	DE	DK	ES	EE	FI	FR	GR	IE	IT	HU	LU	NL	NO	PO	RO	SE	UK	CA	SI
AI mentioned	X	-	X	X	X*	-	-	-	-	X*	-	-	X	-	-	-	-	-	X	X	X*	X	-
Aim to lead	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	X	-	-
Blockchain	X	-	-	-	-	-	-	-	-	-	-	-	-	X	-	X	X	-	-	-	X	-	-
Quantum	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	X	-	-	-	-	X	X	-

- AI is mentioned in 10 National Agendas/Strategies
- UK sets target for AI leadership

e.g. Enabling Autonomous Space Operations

How to **detect** novel behaviour

How to **generate** optimal plans

How to **predict** what is going to happen

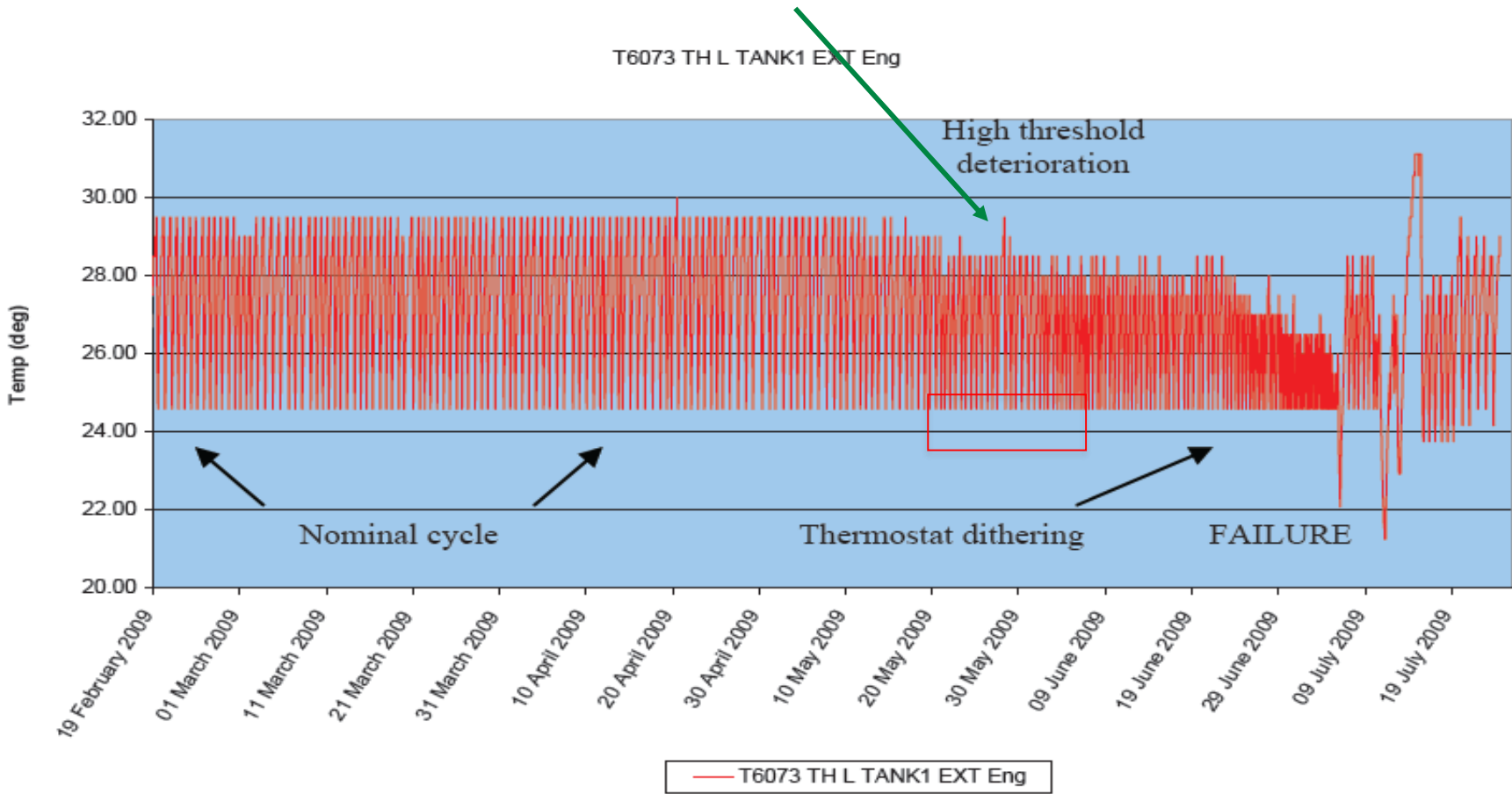
How to **autonomously identify** critical conjunctions



How can we detect novel behaviour ahead of failures



Predictive Maintenance with Machine Learning



Digital Transformation
is
crucial
for
Space!

Thank you!

Bianca.Hoersch@esa.int