



EURODRONES Inc.

A report by Ben Hayes, Chris Jones & Eric Töpfer



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Despite the often benign intent behind collaborative European ‘research’ into integrated land, air, maritime, space and cyber-surveillance systems, the EU’s security and R&D policy is coalescing around a high-tech blueprint for a new kind of security. It envisages a future world of red zones and green zones; external borders controlled by military force and internally by a sprawling network of physical and virtual security checkpoints; public spaces, micro-states and ‘mega events’ policed by high-tech surveillance systems and rapid reaction forces; ‘peacekeeping’ and ‘crisis management’ missions that make no operational distinction between the suburbs of Basra or the Banlieue; and the increasing integration of defence and national security functions at home and abroad.

It is not just a case of “sleepwalking into” or “waking up to” a “surveillance society”, as the UK’s Information Commissioner famously warned, it feels more like turning a blind eye to the start of a new kind of arms race, one in which all the weapons are pointing inwards.

‘Neoconopticon: the EU Security Industrial Complex’, Statewatch/TNI, 2009¹

1. Introduction

This report examines the considerable economic and political support given to the drone industry by the European Union. This support has now reached a level at which we can speak of an emerging EU drone policy based on two interlinked principles. First, there is an urgent need to develop and use drones in Europe for a wide and as yet unlimited range of purposes. Second, the various barriers – chiefly regulatory and technical – to the introduction and routine use of drones in EU airspace must be overcome. This report explains the thinking and actions behind these principles. It documents EU expenditure of some 500 million euros to develop and promote drones since they first appeared on the EU radar in the late 1990s, supplementing the substantial investment in drones by many member states. Yet, save for a few guarded European Commission communiqués, very little information has been made available to the public about the scope and breadth of the EU’s drone activities and ambitions. This report has been produced to inform the peoples of Europe and to encourage activism and debate around what is happening.

For those unfamiliar with the technology, ‘drones’ are typically aircraft – although land and sea-based vehicles are in development – without a human pilot on board. They are also known as unmanned aerial vehicles (UAVs), remotely piloted vehicles (RPVs), or, in conjunction with their ground-based control stations, unmanned aerial systems (UAS) or remotely piloted aerial systems (RPAS). Flight may be controlled by a person stationed elsewhere or by an on-board computer, which is driving the development of increasingly-autonomous drones. As this report will show, drones come in all shapes and sizes, some little different to remote-controlled toy planes, others as futuristic as the spaceships imagined in years gone by. At least 16 of the 27 EU member states already own drones for military (combat and reconnaissance) or non-military (surveillance and detection) purposes.² The design, development and production of more than 400 different unmanned aerial vehicle systems is now reportedly spread across at least 21 EU countries.³

Representatives of the industry tend not to like the term ‘drones’ as their products have become synonymous with ‘drone strikes’ and extrajudicial killings under the CIA and US military programmes in Afghanistan, Pakistan, Yemen and Somalia accelerated by President Obama. They don’t much like the term “unmanned” aerial vehicle either, because it implies that there is no pilot at all, which is why the term “remotely piloted” is back in vogue, though as autonomous drones develop there may be no actual pilot to speak of ultimately.

1 <http://www.statewatch.org/analyses/neoconopticon-report.pdf> or <http://www.tni.org/report/neoconopticon>

2 ‘List of unmanned aerial vehicles’, *Wikipedia*, http://en.wikipedia.org/wiki/List_of_unmanned_aerial_vehicles

3 Peter van Blyenburgh, “UAS Industry & Market Issues”, presentation to European Commission UAS Panel, 1st Workshop, Brussels 12 July 2011, http://ec.europa.eu/enterprise/docs/uas/00_UVS_International.pdf

Few new technologies have captured the media's attention like drones. It's easy to see why. On the one hand, they are among the most visible elements of a revolution in robotics and artificial intelligence that promises to transform not just our airspace but all of the vehicles and appliances we use today. On the other, they epitomise peoples' fears about a world in which we are not just served but *policed* by robots; robots which can kill. Of course, there are many situations in which drones may indisputably serve the public interest – search-and-rescue, environmental monitoring, dealing with hazardous materials etc. – but there are widespread concerns about both military and non-military uses, particularly surveillance.

In the past few years we have witnessed research into and the development of drones capable not just of killing people at distance, but what are effectively flying CCTV cameras, micro-drones equipped with microphones, drones with equipment capable of intercepting mobile phone data, drones with autonomous targeting and tracking capabilities, 'nanodrones', 'public order' drones armed with 'less-lethal' weapons, and much more besides. The safety record of drones also leaves much to be desired: they appear to crash, frequently.⁴ That is scary. Should we rush the insertion of drones into civilian airspace?

All of these things have contributed to a climate of fear and uncertainty in which precious little, if anything, has been done – either by industry or government – to allay the public's growing unease about a world buzzing with drones. While industry bodies may have recently moved into PR campaigns intending to show that drones can "benefit mankind as a whole";⁵ this is not the same thing as open discussion and debate on the issues raised by the introduction of drones into civil airspace.

The EU is subsidising European drone manufacturers, buying expertise from their Israeli counterparts and creating a favourable regulatory climate because it believes that as well as performing some potentially useful tasks, UAVs represent innovation and opportunity. They are clearly moved by industry warnings/threats that Europe will be 'left behind' if it does not fund research, development and implementation. Many EU member states have adopted the same approach. If they care about human rights, they assume Europe's relatively high human rights standards will ultimately protect us from any malevolent intent or misuse.

Technologists and innovators will instinctively steer you in the same direction: never regulate a 'thing', regulate the way it is used. After all, isn't the introduction of unmanned aerial vehicles akin to the gradual introduction of automa-

ted driving processes and 'smart mobility' in our cars?⁶ Of course we should protect worthwhile innovation, but we should not blindly support innovation that brings threats to our rights and liberties. The time to have a proper, *public* discussion about appropriate EU policies including checks-and-balances on the development, manufacture, sale and introduction of drones in both military and non-military contexts is *before* rather than *after* we start to see them in widespread use.

The European Commission has long subsidised research, development and international cooperation among drone manufacturers. The European Defence Agency is sponsoring pan-European research and development for both military and civilian drones. The European Space Agency is funding and undertaking research into the satellites and communications infrastructure used to fly drones. Frontex, the EU's border agency, is keen to deploy surveillance drones along and beyond the EU's borders to hunt for migrants and refugees.

In 2012 the Commission announced that it would coordinate the introduction of drones into civilian airspace in Europe.⁷ A "roadmap" including a target date of 2028 for the full integration of drones into commercial airspace was published in June 2013.⁸ The EU is basing its own timeframe on that of the International Civil Aviation Organisation, with which it will also work to develop global standards for drone flight.

At face value, it appears that EU drone policy has emerged on an *ad hoc* basis as more and more promising uses for drones have been found, arousing the interest of various EU agencies and actors. So taken with drones is the EU, that it argues that they are *already* a crucial "source of growth and jobs" in Europe. Because the development of drone capabilities has regulatory implications, the European Commission now feels compelled to act to ensure that European civil airspace is used in a responsible, considered and effective manner. This is the narrative that the EU is keen to promote.

An alternative interpretation, suggested by the research that follows, is that the agenda has primarily been set by the big drone manufacturers who saw a chance to supplement their core military markets with civil applications. For more than ten years they have lobbied the European Commission, EU agencies, European regulators and national governments to support their industry, fund their research and development and create a regulatory environment in which 'civilian' drones can be sold and used. This effort has been hugely successful. It is no exaggeration to suggest that

4 'Drone Crash Database', *Drone Wars UK*, <https://dronewarsuk.wordpress.com/drone-crash-database/>

5 Ryan Gallagher, 'Surveillance drone industry plans PR effort to counter negative image', *The Guardian*, 2 February 2012, <http://www.guardian.co.uk/uk/2012/feb/02/surveillance-drone-industry-pr-effort>

6 Thilo Koslowski, 'Forget the Internet of Things: Here Comes the 'Internet of Cars'', *Wired*, 1 April 2013, <http://www.wired.com/opinion/2013/01/forget-the-internet-of-things-here-comes-the-internet-of-cars/>

7 European Commission, 'Towards a European strategy for the development of civil applications of Remotely Piloted Aircraft Systems (RPAS)', 4 September 2012, http://www.statewatch.org/observatories_files/drones/eu/com-2012-09-04-draft-roadmap.pdf

8 European RPAS Steering Group, 'Roadmap for the integration of civil Remotely-Piloted Aircraft Systems into the European Aviation System', June 2013, http://www.statewatch.org/observatories_files/drones/eu/com-2013-06-roadmap.pdf

the European Commission has effectively funded the drone industry to lobby the EU for subsidies, market opportunities and a favourable regulatory environment. Since the technology is “interoperable” – meaning civil and military drones will share much of the infrastructure that they need to fly – support for companies developing civilian drones inevitably benefits the manufacturers of the military drones (who at scale are usually one and the same). Chapter 2 explains how drones have climbed the EU’s innovation and regulatory agendas.

Chapters 3 to 6 look at the embrace of drones in different EU policy arenas. Chapter 3 shows how the EU’s research programmes have invested more than €300 million of taxpayers’ money in projects centred on or prominently featuring drone technology. It also examines the various ways in which drones are being adapted for security purposes through research and development projects, all of which are dominated by European (and Israeli) defence multinationals seeking further diversification into ‘civil’ markets.

Chapter 4 examines the role of the European Defence Agency and finds that although EU member states have until very recently repeatedly shunned meaningful defence cooperation (by supporting competing consortia of combat drone manufacturers), the European Defence Agency has overseen projects for unmanned aerial, ground and maritime vehicles with a value of over €190 million. Chapter 5 considers the activities of the European Space Agency (in which most EU member states participate, as well as the EU itself) in developing the infrastructure – GPS, satellite navigation etc. – for drones to fly. Chapter 6 looks at Frontex’s preoccupation with the use of drones and other aerial surveillance technologies for border control purposes.

What emerges is almost unequivocal support for the development of the technological and regulatory infrastructure required for the large scale deployment of drones within the EU. What is much less clear from the hotchpotch of EU projects and initiatives is what drones will actually be used for, and the extent to which the public will accept or appreciate such use. As noted above, no-one is disputing the obvious applications for which drones are likely to significantly reduce the cost of using manned aircraft (such as wide area or continuous surveillance) or provide help in crisis situations too dangerous for humans (the Fukushima meltdown for example). But in many of the scenarios developed for the EU, drones look more like a solution looking for a problem than vice versa.

“You’re quite right”, one drone manufacturer acknowledged to *Statewatch* at a drone conference,⁹ “we don’t actually know what the problem is; we just know that the solution is UAVs”. This mentality has encouraged the development of scenarios in which extremely rare events in Europe (terrorist atrocities, nuclear meltdown, high-speed car chases

etc.) are used to justify both substantial public expenditure and the acquisition and use of drones by domestic police forces. It is here that public fears about killer robots and untrammelled surveillance in skies awash with drones should combine to produce policy considerations of the utmost sensitivity.

Yet, in the absence of meaningful democratic control over EU institutions and agencies, such concerns have been all but entirely overlooked. EU drone policy is being fashioned through entirely technocratic processes that remain largely invisible to the parliaments and peoples of Europe. It is already abundantly clear that just as combat drones have reduced the threshold (cost, risk, capacity etc.) for conducting military strikes against foreign targets (would the USA even be fighting its “dirty wars”¹⁰ in Somalia, Yemen, Pakistan and Afghanistan without drones?), surveillance drones will lower the threshold for launching overt and covert surveillance operations. But instead of exploring and addressing public attitudes around such obvious concerns, the EU is more preoccupied with “public acceptance”, and sees this as something to be manufactured rather than canvassed. Chapter 7 summarises the main conclusions from the research and sets out recommendations to safeguard peoples’ rights and counter the further militarisation of the European Union.

⁹ European Commission Unmanned Aircraft System Panel Process, 4th Workshop on Societal Dimension, 16 November 2011

¹⁰ Jeremy Seahill, ‘Dirty Wars: The World Is a Battlefield’, 2013, New York: Nation Books

The nature of warfare is going through fundamental change, driven by the need to maximise the efficient deployment of military forces, increase surveillance against the threat of terrorism, give a flexible response to such a threat and recognise the vital need to minimise military and civilian casualties resulting from military action. This scenario involves the use of unmanned aircraft systems for both surveillance and force projection. Much of the technology required for this new capability is generic. Deployment of unmanned systems can provide a reliable and cost effective means of surveillance and data management for fisheries protection, border patrols, law and order enforcement, civilian search and rescue and many other applications with considerable market potential. Both civil and defence applications can and should be met by the European aerospace industry. [...] Unless Europe can build its own independent capability in this area [...] there will be severe limitations both in terms of being able to play a significant role in military operations alongside the US or, most significantly, being able to mount independent actions.

- 'STAR 21: Strategic Aerospace Review for the 21st Century' (STAR 21), European Advisory Group on Aerospace, 2002

2. Drones and the European Union: a lobbyist's paradise

2.1. Summary

Drones first entered EU policy discourse with the publication in 2002 of the 'Strategic Aerospace Review for the 21st Century' (STAR 21), which sought to establish a "coherent market and policy framework for a vital European industry" and demanded subsidies for security and defence-related research. The Commission had in fact begun funding drone research the year beforehand through its fifth Framework Programme (FP5). One of the first projects to receive funding was a workshop on "Civilian Applications of Unmanned Airborne Vehicles (UAVs)".

Funding for drone-related research continued to the tune of €15 million for five projects over the next four years. Major European arms firms such as EADS, Thales and BAE Systems led much of the work, again largely geared to promoting and developing the civilian use of drones.

One project, UAV-NET, established a "Thematic Network on the subject of advancing the utilisation of UAVs", and when public funding ended in 2005 the companies involved carried on funding it themselves for at least another five years. Their work was boosted by the establishment of the European Defence Agency in 2005, one of whose initial priorities was unmanned aerial systems, as well as the launch of the Commission's European Security Research Programme and the European Space Agency's new-found interest in security and defence-related research.

One of the key outcomes of much of the work undertaken during this period was the establishment of various "roadmaps", a process that in essence substitutes democratic for technocratic decision-making.

As well as calling for – and frequently obtaining – generous public subsidies for technological research and development, significant work by both public and private bodies has gone into attempts to establish a regulatory environment favourable to drone flights in civilian airspace.

A whole host of initiatives were launched, frequently with the involvement of UVS International (UVSI), an international lobby group for the drone industry. The group also offers annual awards for "personal commitment and contribution to promoting the insertion of unmanned aircraft into non-segregated airspace", which have been awarded to officials from various bodies involved in the push to have drones flying freely in European airspace, such as the European Commission, EUROCONTROL (the European Or-

ganisation for the Safety of Air Navigation), Frontex and the European Aviation Safety Agency.

Both technological research and development and regulatory initiatives eventually led towards a more coherent whole, and a more unified EU drone policy began to emerge. A series of meetings and conferences organised by the Commission led to the drafting in May 2012 of a formal Commission Communication, 'Towards a European strategy for the development of civil applications of Remotely Piloted Aircraft Systems'. This was published in September 2012 and was the first formal EU strategy document on UAVs in 12 years of *ad hoc* initiatives. It led to the establishment of the European Remotely Piloted Aerial Systems Steering Group (ERSG), which subsequently published its own roadmap in June 2013.

The work of the ESG is designed to dovetail with that being undertaken internationally by the International Civil Aviation Organisation (ICAO) – an organisation whose own policies on drones appears to have been influenced heavily by work undertaken by *UVS International*. The ICAO's drones strategy sees "global readiness" for drones in civil airspace by 2028, an opportunity the ESG is seeking to capitalise on. The EU has also signed a bilateral agreement with the US that could see accelerated cooperation on the integration of drones into transatlantic civil airspace.

The ultimate outcome of all of this work is a concerted, coordinated attempt to ensure the widespread use of drones in civil airspace, led by the European Commission, that seeks to side-step democratic debate and decision-making and which has – so far – failed to take seriously concerns over privacy, data protection, and more general acceptance of the widespread use of drones. A new budget line on drone integration has been added "as a politically driven priority" to work on modernising European air traffic management (ATM) systems. Objections are seen not as fundamentally problematic, but rather as something to be overcome through PR campaigns. An annex to the June 2013 Roadmap dealing with "societal issues" was drawn up by a working group containing no representatives from Europe's data protection authorities, despite promises from the Commission that their views were essential. It seems that their input would have been beneficial for the final report, which included the stark statement that in "the public area... there is no privacy at all".

2.2. Reaching for the stars

Drones were first formally introduced into EU policy discourse in July 2002 when the European Commission published STAR 21, the 'Strategic Aerospace Review for the 21st Century'.¹² STAR 21 was drafted by the *ad hoc* European Advisory Group on Aerospace which was comprised of five EU Commissioners,¹³ the directors of six major European aerospace companies,¹⁴ the High Representative for the EU's Common Security and Defence Policy,¹⁵ and two members of the European Parliament.¹⁶ STAR 21 set out to create "a coherent market and policy framework for a vital European industry" in order to promote both economic competitiveness and EU independence in arms production. This included flagrant demands for EU subsidies for research and development (R&D): "It is in the areas of security- and defence-related research that the most pressing need for added efforts to *secure the future of the European industry* is identified", said the report (emphasis added).¹⁷

A new generation of drones had first appeared in Europe several years before when NATO members deployed them for real-time surveillance during their bombing campaign in Kosovo and Serbia in 1999. In 2001, the year before STAR 21 was published, the European Commission began



¹² European Advisory Group on Aerospace, 'STAR 21', July 2002, http://www.statewatch.org/observatories_files/drones/eu/eu-2002-star-21.pdf

¹³ Philippe Busquin, responsible for Research; Pascal Lamy, responsible for Trade; Erkki Liikanen, responsible for Enterprise and the Information Society; Loyola de Palacio, responsible for Relations with the European Parliament and Transport & Energy; Chris Patten, responsible for External Relations

¹⁴ The seven industry representatives on the Advisory Group came from BAE Systems (Sir Richard Evans, chairman), Finmeccanica (Alberto Lina, President & CEO until April 2002), Rolls-Royce (Sir Ralph Robbins, Chairman), SNECMA (Jean-Paul Béchat, Chairman & CEO), Thales (Dennis Ranque, Chairman) and EADS (Manfred Bischoff and Jean-Luc Lagardère, Co-chairmen).

¹⁵ Javier Solana.

¹⁶ Carlos Westerndorff y Cabeza MEP, Chairman of the Industry, Foreign Trade, Research and Energy Committees, and Karl von Wogau MEP.

¹⁷ 'STAR 21', p. 8

to fund drone R&D projects using money from the EU's fifth Framework Research programme (FP5). Amongst the first projects to receive EU funding was a workshop on "Civilian Applications of Unmanned Airborne Vehicles (UAVs)".¹⁸ The project was led by *Israel Aerospace Industries* (IAI), the state-owned manufacturer of the 'Heron' and 'Hunter' drones, amongst others. The objective of the workshop was twofold: to "increase the awareness in the European community regarding the rationale and the benefits of potential civilian missions using UAV's [sic]" and to prepare the ground for future Commission funding in this area.¹⁹ The emphasis at this time was solely on the non-military use of drones because of the prohibition on the EU funding military research.

Over the next four years, the Commission invested a further €15 million in five UAV projects.²⁰ Two of these projects were also led by *Israel Aerospace Industries*. **UAV-NET** established a "Thematic Network on the subject of advancing the utilization of UAVs"²¹ and **CAPECON** (Civil UAV Applications & Economic Effectivity of Potential Configuration Solutions) promoted the "utilisation of safe and low cost Unmanned Air Vehicles".²² The Commission had effectively funded IAI to establish a network of European drone manufacturers to promote their products. Partners in the two IAI-led projects included major European defence contractors such as *EADS*, *Thales* and *BAE Systems* together with aerospace and defence research institutes and academic institutions across Europe. When the funding for UAV-NET ended in 2005, the organisations involved decided to continue funding the project as a means of "promoting the use of UAS [unmanned aerial systems]" in everyday life.²³ The network was active for at least another five years.

The other three EU-funded research projects were geared toward the actual development of UAV systems. The Innovative Future Air Transport System (**IFATS**) project was funded to produce a "revolutionary concept for a future air transportation system by adding as much onboard autonomy to the aircraft as necessary to fulfil the overall requirements of improved efficiency and safety";²⁴ **USICO** (UAV safety issues for civil operations) addressed UAV safety issues for civil operations;²⁵ and **HELINET** (NETwork of Stratospheric Platforms for Traffic Monitoring, Environmental Surveillance and Broadband Services) developed a **HALE** (High Altitude Long Endurance) drone platform for GPS tracking, environmental data processing and broad-

band communications services.²⁶ While all three projects ostensibly addressed the *non-military* use of drones, defence contractors – who had and still have the most cut-



ting-edge aerospace knowledge and expertise – inevitably reaped the rewards. *Israel Aerospace Industries*, for example, as well as leading the UAV-NET and CAPECON projects, participated in both IFATS and USICO.

2.3. The road to drone-ware

In January 2005, 27 of the participants from the first round of EU-funded drone research took it upon themselves to launch a 'European Civil Unmanned Air Vehicles Roadmap' under the heading "25 Nations for an Aerospace Breakthrough".²⁷ The 'Roadmap', which was made up of an 'Overview', an 'Action Plan'²⁸ and a 'Strategic Research Agenda', made four key demands:

- (i) *urgent European support for R&D for civil UAVs²⁹ via a "network of academic institutions, small and medium enterprises, research institutes and large industry groups working together across Europe";³⁰*

18 CORDIS, 'UAV civilian application workshop: environment/communication/safety', http://cordis.europa.eu/projects/rcn/54963_en.html

19 Ibid.

20 See Chapter 3 for a detailed examination of the EU's funding of drone-related research.

21 CORDIS, 'UAV-NET', http://cordis.europa.eu/projects/rcn/61170_en.html

22 CORDIS, 'CAPECON', http://cordis.europa.eu/projects/rcn/63495_en.html

23 UAVNET, <http://uavnet.info/>

24 CORDIS, 'IFATS', http://cordis.europa.eu/projects/rcn/72789_en.html, http://cordis.europa.eu/result/report/rcn/45150_en.html

25 CORDIS, 'USICO', http://cordis.europa.eu/projects/rcn/62821_en.html

26 CORDIS, 'HELINET', http://cordis.europa.eu/projects/rcn/56891_en.html

27 'European Civil Unmanned Air Vehicle Roadmap Volume 1 - Overview', 2005, http://www.statewatch.org/observatories_files/drones/eu/eu-2005-25-nations-breakthrough-vol-1.pdf

28 'European Civil Unmanned Air Vehicle Roadmap Volume 2 - Action Plan', 2005, http://www.statewatch.org/observatories_files/drones/eu/eu-2005-25-nations-breakthrough-vol-2.pdf

29 'Overview', p 12-13

30 'Overview', p.14

(ii) “civil UAVs must be part of the Single European Sky legislation”;³¹

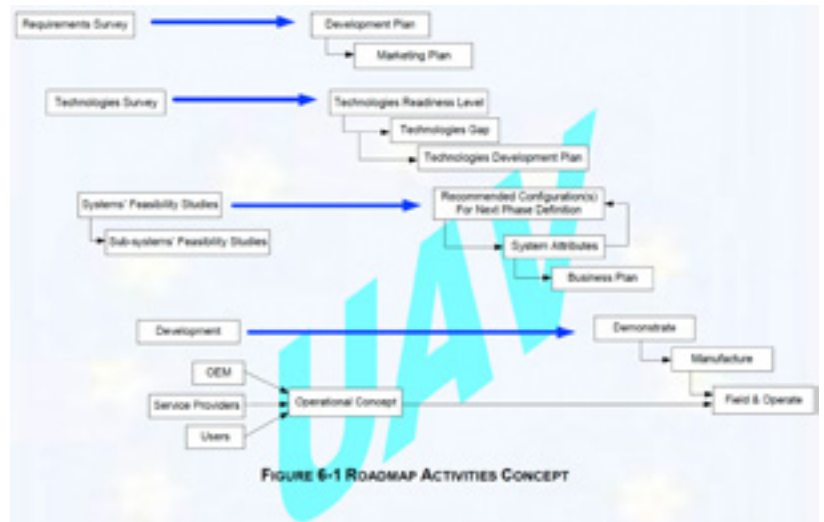
(iii) “enabling strategies” of certification and regulation to address concerns about safety;³²

(iv) adaptation of military systems to pave the way for further civil UAV development.³³

The ‘Action Plan’ set out ambitious proposals for both bringing UAVs to market and addressing technological and regulatory issues, including an ambitious “European model for drone innovation” and a 192-page ‘Strategic Research Agenda’.³⁴ All three texts – the Overview, the Action Plan and the Strategic Research Agenda – credit Mark Okrent, a senior official at *Israel Aerospace Industries* and chairman of the UAV-NET project, as the author. Europeans may be shocked at the extent to which early EU thinking on drones was steered and honed by defence contractors from Israel – not an EU member state – looking for a civil market for their war robots.

In May 2005, four months after the publication of the UAV-NET Roadmap, the head of the newly-established European Defence Agency (EDA) told the member states that “Unmanned Air Vehicles” would be one of the agency’s “flagship” programmes.³⁵ Six months later the EDA signed a €715,000 contract with Finnish firm *Patria Oy* for the development of “Digital LOS & BLOS [line-of-sight & beyond line-of-sight] datalinks for LE [long-endurance] UAVs,” representing the EU’s first full-blown military investment in drones. The EDA’s “flagship programme” and other drone investments are examined in detail in chapter 4.

At the same time, the European Commission was preparing for the launch of the European Security Research Programme and the European Space Agency (ESA, not an EU body, although 18 EU member states as well as EU institutions and agencies participate) was taking an interest in space-based security and defence technologies. The Commission had already convened a ‘Group of Personalities’ to provide advice on setting up its new research programme, including four of the six companies involved in the STAR 21 initiative (*BAE Systems*, *EADS*, *Finmeccanica* and *Thales*). This process, and the resulting security R&D, are discussed in the following chapter. The ESA meanwhile, which is ostensibly geared towards providing and promoting cooperation for “peaceful purposes”, decided to reinterpret “peaceful” as meaning “non-aggressive” rather than “non-military”.



This allowed it to branch out into research, development and procurement related to security and defence policy, and to develop closer links to EU security and defence agencies, leading to structured cooperation on drone technology (in particular, satellite navigation and data links). The activities of the ESA with regard to UAVs are detailed in chapter 6. Together, these initiatives implemented two of the four key demands of the UAV roadmap by paving the way for substantial EU funding for drone R&D and the adaptation of military systems for “civil UAV development”.

‘Roadmaps’ have become commonplace in the development of emerging technologies and new products. Their utility lies in helping different participants in the innovation process reach a consensus about short and long term goals and objectives while helping to plan and coordinate technology developments. They have also become an increasingly popular means for EU officials to manage the development and implementation of new policies. Unfortunately – unlike legislative texts or “white papers” – roadmaps do not invite much wider deliberation. Indeed their very use appears designed precisely to avoid discussion and debate by pre-defining policy objectives and outcomes. In this sense they appear profoundly undemocratic.

The adoption by the European Commission in February 2008, for example, of a ‘roadmap’ to develop the ambitious new EU border surveillance system, **EUROSUR**, allowed for the technical development of the system and substantial EU expenditure to occur well in advance of the legislation establishing it, which wasn’t tabled until December 2012. This meant that European parliaments and the public were entirely excluded from the EUROSUR decision-making process until the system was all but up-and-running, presenting legislators and civil society organisations with a *fait accompli*.³⁶

31 ‘Overview’, p.30

32 ‘Action Plan’, p.6

33 ‘Overview’, p.28

34 Frost & Sullivan, although not a partner in the UAVNET project, actively participated in the workshops and was contracted, due to their expertise in this field, to perform a market research study on Europe exclusively for the Roadmap.

35 ‘Report by the Head of the European Defence Agency to the Council’, 8967/05, 17 May 2005, p.4, http://www.statewatch.org/observatories_files/drones/eu/eda-2005-report-head-to-council.pdf

36 See ‘Borderline: The EU’s New Border Surveillance Initiatives. Assessing the Costs and Fundamental Rights Implications of EUROSUR and the “Smart Borders” Proposals’, *Heinrich Böll Foundation*, June 2012, <http://www.statewatch.org/news/2012/jun/borderline.pdf>

The problems surrounding the substitution of democratic decision-making for technocratic road-mapping are particularly acute with respect to the European Commission's decision to introduce drones into civilian airspace, facilitating their use for a whole host of purposes including for

surveillance and security. It is not just that the Commission has sidestepped parliament and the public; the process appears to have been almost entirely outsourced to the drone industry.

Roadmaps and EU drone policy

Year	Roadmap title	Funder(s)	Authors
2005	European Civil Unmanned Air Vehicles - Roadmap, ³⁷ Action Plan, ³⁸ Strategic Research Agenda	FP5 (UAVNET, CAPECON, USICO)	25 partners led by Israel Aerospace Industries including Augusta-Westland, Airobotics, Alenia, Marconi, BAE, Onera, EADS, SNECMA, Eurocopter, Tadiran, Thales & Sonaca
2008	Study Analysing the current activities in the field of UAV: Way forward ³⁹	DG Enterprise	Frost & Sullivan
2008	Roadmap for the seamless integration of UAS within General Air Traffic by 2015 ⁴⁰	EDA	Air4All consortium: Alenia Aeronautica, BAE Systems, Dassault Aviation, Diehl BGT Defence, EADS-Cassidian, Selex Galileo, QinetiQ, Rheinmetall, Saab, Sagem, Thales
2010	Regulatory Roadmap for UAS Integration ⁴¹	FP6 (INOUI)	DFS, ISDEFE, Boeing, Rheinmetall & Innaxis
June 2013	Roadmap for the integration of civil Remotely-Piloted Aircraft Systems into the European Aviation System; ⁴² A Regulatory Approach for the integration of civil RPAS into the European Aviation System ⁴³	European Commission	European Remotely Piloted Aerial Systems Steering Group (includes industry representatives from Global Aerospace, Safran, Indra, EADS-CASA, Alenia Aermacchi, and UVSI)
December 2013	Master plan relative to the insertion of remotely piloted aircraft systems in (RPAS) in the European air transport system	FP7 (ULTRA)	A2Tech, Boeing, Honeywell, NLR, Studio Legale, Cranfield, Indra, Onera, Blyenburgh & Co, DFS, Integra, Thales

Not only do these ambitious 'roadmaps' have the effect of reducing parliamentary decision-making to a rubber stamp, they create the impression that the deployment of drones is both imminent and inevitable. In May 2013 the German government decided to cancel a €1.5 billion order for customised *Northrop Grumman RQ-4 Global Hawk* drones (dubbed EuroHawks) citing insurmountable obstacles to actually using them due to civil aviation restrictions. The project had already cost the German taxpayer €562 million, leading to searching questions about the role of the EU and multinational arms companies in "overhyping" the technology before it was anywhere near ready.⁴⁴

2.4. Establishing a favourable regulatory environment

As well as seeking funding and political support for their R&D, drone manufacturers have also lobbied relentlessly

for domestic and intergovernmental regulators to adopt rules favouring the roll out of UAVs, demands which have been transposed into successive roadmaps.

In 2001 *EURO UVS*, which later became *UVS International* (see box 1, page 17 below), submitted a funding application to the European Commission for a European Thematic Network on UAV Airworthiness and Air Traffic Management called **UCARE** (UAVs: Concerted Actions for Required Regulations). When UVSI's application was turned down by the Commission, the companies behind it decided to fund the initiative themselves. The stated aim was to "federate the international UAV community within a dedicated framework to create the required basis for issuing a consensual policy and competence standards".⁴⁵ In essence, UCARE aimed to establish a network of policy makers and drone manufacturers to develop the regulatory mechanisms and standards necessary for the introduction of dro-

37 http://www.statewatch.org/observatories_files/drones/eu/eu-2005-25-nations-breakthrough-vol-1.pdf

38 http://www.statewatch.org/observatories_files/drones/eu/eu-2005-25-nations-breakthrough-vol-2.pdf

39 http://www.statewatch.org/observatories_files/drones/eu/com-2007-frost-sullivan-2.pdf

40 The final report is not publicly available, although a presentation produced by the Air4All consortium provides an overview: http://www.statewatch.org/observatories_files/drones/eu/air4all-2009-presentation.pdf

41 http://www.statewatch.org/observatories_files/drones/eu/inoui-2009-regulatory-roadmap.pdf

42 http://www.statewatch.org/observatories_files/drones/eu/com-2013-06-roadmap.pdf

43 http://www.statewatch.org/observatories_files/drones/eu/com-2013-06-roadmap-annex-1.pdf

44 Claus Hecking, 'Unbemannte Flugkörper: Auch Europa drohnen Drohnen-Debakel', *Spiegel Online*, 21 May 2013, <http://www.spiegel.de/politik/ausland/fehlende-zulassung-auch-der-eu-droht-ein-drohnen-debakel-a-900938.html>

45 Peter van Blyenburgh, 'UCARE programme update', <http://www.dtic.mil/cgi-bin/GetTRDoc?AD=ADA427343>, undated, p.4

nes into civilian airspace, controlled by a “Steering Group” of large corporations – the “principal UAV stakeholders”, according to a presentation.⁴⁶

UCARE was, to all intents and purposes, a lobbying initiative that sought to persuade EUROCONTROL (European Organisation for the Safety of Air Navigation), FAA (Federal Aviation Administration of the USA), JAA (Joint Aviation Authorities of Europe), NATO (North Atlantic Treaty Organisation), WEAO (Western European Armaments Organisation) and national Civil Aviation Authorities (CAAs) to adopt regulations allowing both the military and non-military use of drones. This strategy bore fruit in 2002 when, “after substantial lobbying by UVS International”, JAA and EUROCONTROL decided to establish a joint ‘UAV Task Force’. *UVS International* generously “fulfilled the Task Force’s secretariat function”.⁴⁷ The Task Force’s final report was published in May 2004 and addressed the airworthiness of drones and their certification; the training and licensing of drone pilots; security of communication between ground stations and UAVs; and air traffic management, including the question of how to avoid mid-air collisions (“sense and avoid”).⁴⁸

In November 2005, the European Aviation Safety Agency (EASA, an EU agency) took the “first step towards more comprehensive UAV regulation” by launching a public consultation on the certification of UAVs weighing more than 150kg (regulation of those weighing less than 150kg remains the responsibility of national aviation authorities). The aim of the exercise was “to stimulate the development of UAV [sic] even if it does not allow for UAVs to fly directly into non-segregated airspace but provides a starting basis for them to do so.”⁴⁹ The joint JAA and EUROCONTROL Task Force report provided the basis for EASA’s consultation, which by 2006 had received 320 comments from 45 organisations and individuals – “national authorities, professional organisations and private companies.”⁵⁰

In 2009 EASA published its final report, ‘Airworthiness Certification of Unmanned Aircraft Systems’, prepared by David Haddon and Yves Morier (see further Box 1, pp 17 below).⁵¹ The report states that the safety of individual drones should be assessed in comparison to the hazard presented by manned aircraft “to obtain an indication of the appropriate airworthiness standards that should be applied. Restricted airworthiness certificates may be granted for un-



manned aircraft systems that pose “little risk to people or property on the ground (including take-off and landing)” on the basis of French military or NATO airworthiness requirements. However, the authors also noted that the policy “represents a first step in the development of comprehensive civil UAS regulation,” designed to act as “an interim solution to aid acceptance and standardisation of UAS certification procedures and will be replaced in due course.”

While EASA described the policy brief as an important first step in the development of a comprehensive regulatory framework it went on record to “insist that *operational use of UAV is a political decision that goes well beyond the Agency’s role and responsibilities*” (emphasis added).⁵² EASA was supportive of the creation of a group that would “identify building blocks and define a road map”, and called upon the European Commission, which in its view was “competent for all issues related to UAV regulation”, to take the lead.⁵³

The European Defence Agency was also addressing regulatory issues and in early 2007 was preparing to tender for a major study on ‘UAV Insertion into General Air Traffic’. Considering its apparently civil application, on first appearance this would seem to lie outside the EDA’s remit. However, the legislation establishing the agency enables it to participate in research for “security” or civil purposes, allowing decision-makers to take into account potential civil-military ‘synergies’ in research and development. The EDA’s study attracted the attention of European industry, in particular the UAS Working Group (UASWG) of the

47 Peter van Blyenburgh, ‘Promoting International Coordination & Cooperation’, June 2012, p.6, http://uvs-international.org/index.php?option=com_flippingbook&view=book&id=3&page=1&Itemid=375

48 UAV Task Force, ‘A concept for European regulation for civil unmanned aerial vehicles (UAVs)’, 11 May 2004, http://www.statewatch.org/observatories_files/drones/eurocontrol-2004-jaa-eurocontrol-uav-report.pdf

49 EASA, ‘Advance Notice of Proposed Amendment (NPA) No 16/2005 – Policy for Unmanned Aerial Vehicle (UAV) Certification’, 2005, p.15, http://www.statewatch.org/observatories_files/drones/eu/easa-2005-proposed-amendment-uav-policy.pdf

50 EASA, ‘Comment Response Document (CRD) to Notice of Proposed Amendment (NPA) 16-2005 – Policy for Unmanned Aerial Vehicle (UAV) Certification’, 2005, p.2, http://www.statewatch.org/observatories_files/drones/eu/easa-2005-proposed-amendment-uav-policy-response.pdf

51 EASA, ‘Policy Statement Airworthiness Certification of Unmanned Aircraft Systems (UAS)’, August 2009, p.3, http://www.statewatch.org/observatories_files/drones/eu/easa-2009-policy-statement-uas.pdf

52 EASA, ‘Advance Notice of Proposed Amendment (NPA) No 16/2005 – Policy for Unmanned Aerial Vehicle (UAV) Certification’, 2005, p.9, http://www.statewatch.org/observatories_files/drones/eu/easa-2005-proposed-amendment-uav-policy.pdf

53 EASA, ‘Comment Response Document (CRD) to Notice of Proposed Amendment (NPA) 16-2005 – Policy for Unmanned Aerial Vehicle (UAV) Certification’, 2005, p.5, http://www.statewatch.org/observatories_files/drones/eu/easa-2005-proposed-amendment-uav-policy-response.pdf

European Aerospace and Defence Manufacturers Association (ASD Europe). The UASWG emerged from the *European UAV Industry Consultation Body (ICB)*, an organisation that had been established by *UVS International* in 2005 to be the “industrial focal point for all European authorities”. The new group was much larger and comprised of all of Europe’s major arms companies.⁵⁴ A consortium of UASWG members – *Alenia Aeronautica*, *BAE Systems*, *Dassault Aviation*, *Diehl BGT Defence*, *EADS-Cassidian*, *Selex Galileo*, *QinetiQ*, *Rheinmetall*, *Saab*, *Sagem* and *Thales* – subsequently won the €500,000 contract with the EDA.

By July 2008 the consortium, under the name Air4All, had produced the ‘Roadmap for the seamless integration of UAS within General Air Traffic by 2015’. Concerned with the complex technical and regulatory developments required to permit unfettered drone flight in civil airspace, the consortium simply took for granted that governments would be happy to endorse – and fund – the requirements outlined by industry. The roadmap envisaged the introduction of drones into civil airspace in a number of “steps”, beginning with flying “experimental UAS within national border in segregated airspace” and ending with the flight of a “civil UAS... across national borders routinely in non-controlled airspace”.⁵⁵ The Air4All consortium was subsequently contracted by the EDA to produce a €185,000 ‘Follow-on study’,⁵⁶ which allowed Air4All to gather “further comments of the stakeholder community”; “improve participating Member States’ interaction with Consortium”; and to undertake further work on crew licensing and control stations.⁵⁷

Meanwhile, at the same time as both the EDA and the EASA, a project funded through the EU’s sixth Framework Programme (FP6) was hoping to develop “a roadmap to the future of UAVs in the context of the ever changing ATM [air traffic management] environment”⁵⁸ in order to assist with “the integration of Unmanned Aerial Systems (UAS) in non-restricted airspace.” The overall objective of this project, Innovative Operational UAS Integration (INOUI), was “to contribute for the solution of UAS integration in the 2020 Air Traffic Management [ATM] system, especially the SES [Single European Sky] implementation programme SESAR [Single European Sky ATM Research].” SESAR is a €2.1 billion project that aims to develop “a modernised air traffic management system for Europe”.⁵⁹

Noting that SESAR had failed to take into account the potential future widespread use of drones, INOUI was commissioned by the Commission’s Directorate-General for

Energy and Transport. The project began in October 2007 and ended in October 2009, and the EU provided just over half (€2.3 million) of its €4.3 million financial backing. The rest came from the participants: the German companies *Deutsche Flugsicherung GmbH* and *Rheinmetall Defence Electronics*, Spain’s *Isdefe* and *Boeing Research and Technology Europe*, the French *Office National d’Etudes et de Recherches Aérospatiales* (Onera), and the Spanish *Fundacion Instituto de Investigacion Innaxis*. The project had six work packages: New Airport Concepts for UAS; Safety Analysis for Civil UAS Applications; 2020 Seamless “UAS Enabled” ATM Enterprise Architecture; 2020 Common Operating Picture; Certification Blue Print for UAS in Europe; and UAS ATM Concepts, Procedures and Requirements for 2020.

Beyond a brief mention in the Commission’s September 2012 Communication on drones, it is unclear what impact the INOUI project had. According to a report from the project’s final seminar, Peter Ahlers, the head of SESAR’s Target Concept and Architecture department, said that:

*SESAR needs the expertise gathered in INOUI concerning UAS operations and requirements. We will consider and integrate UAS operations in concepts and system architecture and the results of INOUI will be used to update the CONOPS [concept of operations].*⁶⁰

However, it was not until April 2012 that the SESAR Joint Undertaking (SESAR JU or SJU, the body responsible for developing and implementing SESAR) launched “a specific study on the integration of UAS in non-segregated airspace in a SESAR air traffic management scenario.” The study – ICONUS or Initial CON OPS for UAS in SESAR – is to be carried out by “the ATM FUSION Consortium of Associate Partners to the SJU”, made up of France’s *Onera* and *ENAC*, Sweden’s *AVTECH*, Italy’s *CIRA* and *Deep Blue*, and Spain’s *INTA*.⁶¹

In February 2013, SESAR ran a series of workshops, one of which focused on “integration of unmanned systems in ATM.” Speakers at the workshop – “experts from the civil and military fields” – “were unanimous in confirming [that] synergies with the current SESAR work programme are crucial for successful RPAS development in the civil and military realms.”⁶² SESAR JU will undertake work on System Wide Information Management (SWIM), that “will allow all actors of ATM... to participate to a common network for information exchange,” as part of the ‘Regula-

54 Peter van Blyenburgh, ‘Promoting International Coordination & Cooperation’, June 2012, p.6, http://uvs-international.org/index.php?option=com_flippingbook&view=book&id=3&page=1&Itemid=375

55 Air4All, ‘UAV Insertion into General Air Traffic’, May 2009, p.10, http://www.statewatch.org/observatories_files/drones/eu/air4all-2009-presentation.pdf

56 EDA, ‘2008 Financial Report’, June 2009, p.27, http://www.statewatch.org/observatories_files/drones/eu/eda-2008-financial-report.pdf

57 Air4All, ‘UAV Insertion into General Air Traffic’, May 2009, p.16, http://www.statewatch.org/observatories_files/drones/eu/air4all-2009-presentation.pdf

58 CORDIS, ‘INOUI’, http://cordis.europa.eu/projects/rcn/86569_en.html

59 SESAR Joint Undertaking, ‘About us’, <http://www.sesarju.eu/about>

60 INOUI, ‘A vision for the future’, undated, http://www.statewatch.org/observatories_files/drones/eu/inoui-2011-uas-panel-contribution.pdf

61 SESAR JU, ‘SESAR launches study on Unmanned Aircraft’, 17 April 2012, <http://www.sesarju.eu/news-press/news/sesar-launches-study-unmanned-aircraft-1070>

62 SESAR JU, ‘SESAR workshops’, February 2013, <http://www.sesarju.eu/atc/sesar-workshops>

tory Roadmap⁶³ produced by the European RPAS Steering Group (see 'Towards an EU drone policy', below).

Box 1: UVS International: the drone manufacturers' lobbyists

UVS International is an international lobby group which represents the interests of drone manufacturers. It is registered as a non-profit organisation in the Netherlands. It was founded as *EURO UVS* in 1995 by Peter van Blyenburgh. *UVS International* initially served as an informal network among European drone manufacturers and advocates. Mr. van Blyenburgh is still president of the organisation and seemingly ever-present in EU discussions about all drone-related matters. Blyenburgh & Co also own www.uvs-info.com, a website dedicated to promoting the development and implementation of drone systems.

UVS International now boasts 250 members in 34 countries. The Executive Committee of its Board of Directors consists of van Blyenburgh, Jean Caron of *EADS-Cassidian*, and Horst Schmidt-Bischoffshausen of *STIC Consulting*. Non-Executive Members of the board include employees of firms such as *Boeing*, *Patria*, *Thales*, *General Atomics*, *Bluebird Aero Systems*, and *Sagem DS* amongst others.⁶⁴

The stated objectives of *UVS International* are to promote drones of "all sizes and classes and their current and future applications" by providing "a channel for information exchange between industry, governmental authorities (civil & military), civil aviation authorities, academia, civil & military R&D organizations, and international organizations". *UVS International* is also dedicated to "the establishment of unmanned aircraft systems (UAS) related standards, airworthiness, certification & air traffic management (ATM) norms on national, pan-European and international levels, and to co-ordinate the various national efforts on a global level, in order to contribute towards an early harmonization of the diverse national approaches."

In addition to more than 150 paying corporate members, *UVS International* includes 109 'honorary members', described as 'National Regulatory Authorities', 'National Military Authorities', 'NATO' and 'Government'. The purpose of having these honorary members is to allow all members to circumvent "official channels, thereby making the circulation of information much faster, and at the same time creating beneficial relationships."

UVS International also awards annual prizes to individuals for their services to drone policy innovation, including the 'Catherine Fargeon Prize' recognising "personal commitment and contribution to promoting the insertion of unmanned aircraft into non-segregated airspace and/or the general promotion of the future use of unmanned aircraft." More than a dozen EU policy-makers and regulators have received this award since 2005. Many have sat – and continue to sit – alongside *UVS International* representatives in forums established to push European drone policy forwards. Those who have received the Catherine Fargeon Prize include:

- 2013: Jean-Pierre Lentz, European Commission Directorate-General (DG) for Enterprise & Industry; Michael Standar, SESAR Joint Undertaking;
- 2012: Daniel Calleja, Director General, DG Enterprise and Industry and Matthew Baldwin, Director of Aviation and International Transport Affairs, DG Mobility and Transport;
- 2011: Dave Haddon and Filippo Tomasello, European Aviation Safety Agency; Mike Lissone, EUROCONTROL;
- 2010: Zdravko Kolev, research officer at Frontex; Major General Carlo Magrassi and Martin Stouassavliewitsch, both of the European Defence Agency; Filippo Tomassello, European Aviation Safety Agency;



⁶³ European RPAS Steering Group, 'A Regulatory Approach for the integration of civil RPAS into the European Aviation System', June 2013, p.23, http://www.statewatch.org/observatories_files/drones/eu/com-2013-06-roadmap-annex-1.pdf

⁶⁴ UVS International, '2013 Board of Directors', http://www.uasvision.com/wp-content/uploads/2013/02/UVS-International_BoD-2013_130215_PO-M.pdf

- 2009: Gilles Fartek, then European Commission Advisor for Air Transport and UAS Integration and since 2010 Director of the EU & NATO Affairs section of the firm Integra AS Consulting (Fartek is also a *UVS International* Board member);
- 2007: Holger Matthiesen and Wing Commander Mike Strong, EUROCONTROL;
- 2005: Gilbert Amato, EUROCAE (European Organisation for Civil Aviation Equipment); Yves Morier, European Aviation Safety Agency.

In 2005 *UVS International* provided assistance to *Conseil Général de l'Armement* (CGArm), a French think tank reporting directly to the French Minister of Defence, in a study entitled 'Unmanned Aircraft Systems for Security & Environmental Purposes' (USEP), which also covered "various other civil (commercial and non-commercial) purposes in Europe." The think tank brought in *UVS International* to help develop a "federated pan-European initiative" – the lobby group was to "contribute by acting as the channel of communication, the symposiums organiser and as professional backbone."⁶⁵

The USEP study looked at "global security applications" for military, police, customs and "fire brigade/homeland security" services (including "close combat", "law and order", "pacific or hostile events surveillance", "detection of forest fires" and "strategic surveillance"), as well as civilian and environmental applications (such as "pollens surveillance", "ground water layers analysis", and "climatic and meteorological measurements"). The report, by Dr. Catherine Fargeon and General François Lefaudeux, concluded that there should be substantial public funding for a variety of areas essential to the future development of drones for both civil and military uses: sense and avoid systems; secure communications links; imaging, multi-spectral and hyper-spectral sensors; "mobile phone homing" as "asked for by police and other users"; and alternative airborne power sources such as fuel cells and solar cells, amongst other things. More detailed scenarios and 'business hypotheses' contained in the report's annexes were not released to the public.⁶⁶

2.5. Towards an EU drone policy

From 2007 onwards, with R&D for both military and non-military drone applications now underway and the issues of regulation and certification being discussed in various intergovernmental and multilateral fora, the EU began to transform a patchwork of initiatives and projects into a more coherent whole. First the European Commission hired consultancy firm *Frost & Sullivan* to assess the "industrial/economical/political situation"⁶⁷ and set out yet another "vision" for UAVs in Europe together with "what needs to be done to make it happen."⁶⁸ Like their EU-funded predecessors, *Frost & Sullivan* accentuated the "market opportunities" for 'civilian' drones:

Once restrictions on its emergence are finally swept away, the potential scale of the commercial [drones] market is likely to be much larger than the military market. [...] In the wide range of areas where it would be feasible to replace manned aircraft with UAVs, the market for non-military applications is much larger than the defence sector and includes: Police/Paramilitary/Security applications; Agriculture spraying/planning; Low Earth Orbiting Satellites; Logistics/parcel

*delivery; Commercial passenger [sic] transport; Aerial photography.*⁶⁹

The study recommended that the EU institutions pull out all the stops to support the development and implementation of drone systems. *Frost & Sullivan* called for targeted security funding to be "channelled through existing institutions such as Frontex" (the EU border agency, see chapter 6) and "continued synergy between civil and military research" because "initiatives from essentially defence oriented organisations such as EDA (European Defence Agency) and NATO go some way towards helping the insertion of UAVs in civil aerospace."⁷⁰

All the elements of the EU's drone policy were now in place – a European R&D community, sympathetic regulators, willing end-users and a pervasive (if perverse) economic argument – and the European Commission came under increased pressure to consolidate its *ad hoc* support for UAVs into a formal framework. In July 2010 the Commission organised a joint 'High Level Conference on Unmanned Aircraft Systems' with the EDA where 450 enthusiastic participants discussed how to speed up the insertion of drones into civil airspace.⁷¹

65 Peter van Blyenburgh, 'Promoting International Coordination & Cooperation', June 2012, p.7, http://uvs-international.org/index.php?option=com_flippingbook&view=book&id=3&page=1&Itemid=375

66 Ibid.

67 Frost & Sullivan, 'Study analysing the current activities in the field of UAV – First Element: Status', 2007, http://www.statewatch.org/observatories_files/drones/eu/com-2007-frost-sullivan-1.pdf

68 Frost & Sullivan, 'Study analysing the current activities in the field of UAV – Second Element: Way forward', 2007, http://www.statewatch.org/observatories_files/drones/eu/com-2007-frost-sullivan-2.pdf

69 'First Element: Status', p.8

70 'Second Element: Way forward', p.89-90

71 European Commission DG Mobility and Transport, 'European unmanned aircraft systems (UAS)', http://ec.europa.eu/transport/modes/air/uas_en.htm

One key outcome of the High Level UAS Conference was an agreement to create a new 'High Level Group' (HLG) to "discuss the way forward and advise the Commission" on "the entire UAS sector". The HLG was to be composed of "representatives from Member States, relevant European and international organisations, user groups and public authorities, whilst working closely with representatives from industry, the scientific research community and academia." "Military representatives" were to be closely involved "in order to ensure that the dual nature of UAS operations shall be addressed from the outset."⁷²

However, the HLG did not materialise in its intended form. Instead, in 2011 the Commission announced to an informal meeting with industry representatives at the Paris Air Show that it was establishing a more modest sounding "UAS Panel" to "produce a concise policy document, describing the current competitive situation for UAS globally, as well as the key challenges and obstacles, which need to be addressed to ensure their development and operation in Europe."⁷³ The UAS Panel organised a series of five workshops between July and November 2011, addressing the following topics:

- (i) *industry and market issues;*
- (ii) *certification standards, international rules and frequency management;*
- (iii) *safety and regulatory issues;*
- (iv) *societal dimension (privacy, data protection, liability, societal, ethics); and*
- (v) *research and development.*

Each panel debated a discussion paper drawn up by key stakeholders. The first workshop on industry and market issues debated a text produced by Peter van Blyenburgh (of *UVS International*), Erik Berglund (Frontex) and Allyn Thomas (formerly of Kent Police, UK) – a public-private combination that might lead some to suspect conflicts of interest were afoot. At the workshop Mr van Blyenburgh also made the opening and closing remarks. The discussion

paper rehashed the arguments that the Commission had been hearing (and funding) for years: drones are an economic imperative; R&D must be backed by an enabling regulatory environment. During the workshop various drone manufacturers put their business cases to the Commission while Frontex and Kent Police extolled the benefits of UAVs for policing and border control.

This set the tone for the rest of the panels. National and international regulators debated a EUROCONTROL discussion paper on certification for Workshop 2; industry suppliers and military and security were there to set out their own requirements.⁷⁴ The European Aviation Safety Agency provided the discussion paper on safety issues for Workshop 3; users and manufacturers were on hand to advise them on ways forward.⁷⁵ Workshop 4 was notable as it was the first time that "societal issues" had been addressed by the architects of the EU's nascent drone policy.⁷⁶ The discussion paper, 'Benefits for citizens, liability, privacy and data protection, societal impacts, ethics', was drawn up by Alfredo Roma (a member of the advisory board of the *European Space Policy Institute* and closely involved with a number of Italian and European space and aviation projects), who chaired the meeting. The first session heard from Italian MEP Vittorio Prodi who explained "the European Parliament strategy for UAS and benefits for citizens."⁷⁷ Prodi is chair of the European Parliament's Sky and Space Intergroup, for which he receives "human resources" in the form of "secretariat functions" for up to three days a month, from ASD Europe.⁷⁸ His speech on the Parliament's "strategy for UAS", during which he "reiterated the support of the European Parliament to the development of UAS for civil use" must have come as news to other members of the European Parliament, who have not yet had the pleasure of discussing EU drone policy, never mind adopting a strategy on the issue.⁷⁹

By May 2012 the European Commission was ready to present its draft "strategy for the future of UAS in the EU" to a meeting of Commission DGs (Enterprise & Industry, Transport, Research & Innovation); EU and inter-governmental agencies (EUROCONTROL, EASA, EDA, European Space Policy Institute or **ESPI**); *UVS International*; and a "who's who" cast of European arms firms including

⁷² European Commission, 'Conclusions of the first European High Level Conference on Unmanned Aircraft Systems', July 2010, http://www.statewatch.org/observatories_files/drones/eu/com-2010-07-high-level-conference-conclusions.pdf

⁷³ UVS International, 'The European Commission's process to develop a strategy for UAS in the EU – Background & Objectives', 2011, p.2: http://www.uvs-info.com/index.php?option=com_docman&task=doc_view&gid=7504&Itemid=212

⁷⁴ EUROCONTROL, '2nd EU UAS Panel workshop report', November 2011, http://www.statewatch.org/observatories_files/drones/eu/com-2011-uas-panel-report-2.pdf

⁷⁵ Michael Smethers, 'Report on workshop on safety – 19 October 2011', 2011, http://www.statewatch.org/observatories_files/drones/eu/com-2011-uas-panel-report-3.pdf

⁷⁶ Ben Hayes of TNI/Statewatch addressed this panel, sandwiched between representatives of ASD (Europe's largest defence industry lobby group) and *SAFRAN* (a merger between French defence giants Sagem and SNECMA): European Commission, '4th Workshop on UAS – Societal dimension', November 2011, http://www.statewatch.org/observatories_files/drones/eu/com-2011-uas-panel-agenda-4.pdf

⁷⁷ Alfredo Roma, '4th Workshop on Societal Dimension – 16 November 2011', 21 November 2011, http://www.statewatch.org/observatories_files/drones/eu/com-2011-uas-panel-report-4.pdf

⁷⁸ European Parliament, 'Declaration of financial interests in connection with the political activities of groupings of members – year 2011', June 2012, http://www.statewatch.org/observatories_files/drones/eu/ep-2011-financial-interests.pdf; Vittorio Prodi, 'Declaration of Members' Financial Interests', 28 March 2013, http://www.statewatch.org/observatories_files/drones/eu/ep-2013-prodi-financial-interests.pdf

⁷⁹ It appears from the report of the meeting by Alfredo Roma (footnote 74) that Vittorio Prodi was speaking in his role as chairman of the Sky and Space Intergroup, in which case it is questionable whether he should have been making claims about the opinions of the European Parliament. According to the European Parliament website (emphasis in original): "Intergroups can be formed of Members from any political group and any committee, with a view to holding informal exchanges of views on particular subjects and promoting contact between Members and civil society. Intergroups are not Parliament bodies and therefore may not express Parliament's opinion." See: European Parliament, 'Intergroups', <http://www.europarl.europa.eu/aboutparliament/en/00c9d93c87/Intergroups.html>

Alenia Aeronautica, BAE Systems, Dassault, EADS Cassidian, Indra, SAAB, and Thales. Also present were officials representing “UK border surveillance”. The Commission’s formal Communication, ‘Towards a European strategy for the development of civil applications of Remotely Piloted Aircraft Systems’, was finally released on 6 September 2012.

This Commission “Staff Working Paper” represents the first formal EU strategy document on UAVs in 12 years of ad hoc initiatives. It suggested that:

To support the coordinated approach, and, in particular, the definition of the Roadmap, one possible solution could be the coordination of all regulatory initiatives under a European RPAS Steering Group (ERSG). The ERSG should involve, as a minimum EASA, EUROCONTROL, SESAR JU, EDA, JARUS [Joint Authorities for Rulemaking on Unmanned Systems], industry and EU Member States experts on a voluntary basis. This approach would allow the European Commission to gather the necessary expertise under an overarching process (which also includes research and other complementary measures) and coordinate all required regulatory actions.⁸⁰

In fact, this “possible solution” had already been decided upon. In the days before the document was made available to the public, two of three sub-groups of the ERSG held their first meetings. Working Group 1, dealing with regulatory and radio frequency issues and led by EASA, met at the headquarters of EUROCONTROL in Belgium on 5 September. The day before, 4 September, saw the first meeting of Working Group 2, dealing with R&D and technology issues, and led by the Single European Sky Air Traffic Management Research Joint Undertaking, or SESAR JU. Working Group 3 – dealing with “complementary issues” such as “liability/insurance; privacy; data protection” and “measures to increase public acceptance” – met for the first time in Bologna on 11 September.

The publication of the Commission’s strategy document thus appears little more than a public relations exercise intended to disguise a *fait accompli*: the ERSG in fact held its first meeting on 6 July, with participants agreeing upon the group’s objective: “coordinate all the activities necessary to achieve an initial insertion of RPAS into the European air traffic by 2016.” By the time the Commission’s Com-

munication was published, the “suggestions” it made were already being put into practice. According to the UK government, the reason work began before publication was because “completion of the document took longer than expected” and so “the Commission decided to establish the [ERSG], suggested in it, in advance of the document being published.”⁸¹ The three sub-Working Groups of the ERSG therefore began their tasks – mainly geared towards aligning their own work with that of the ICAO, on the basis of a 90-page ‘Regulatory Roadmap’ – before the public or national parliaments were even aware of the proposals.

In June 2013 the follow-up to the Commission’s September 2012 document was published as the ‘Roadmap for the integration of civil Remotely-Piloted Aircraft Systems into the European Aviation System.’⁸² Covering much of the same ground as before – RPAS “will generate the emergence of a new service sector” and “can contribute to industrial competitiveness, promote entrepreneurship and create new business in order to generate growth and jobs” – it also outlined “three basic prerequisites” that “are expected to apply to RPAS”:

1. *RPAS must be approved by a competent authority. According to the International Civil Aviation Organisation (ICAO), they are systems comprising a remotely piloted aircraft (RPA), one or more associated remote pilot station (RPS), the required command and control (C2) links, including those supported by satellite communications, and any other components as specified in the type design of the RPAS.*
2. *The RPAS operator must hold a valid RPAS operator certificate.*
3. *The remote pilot must hold a valid licence.*

The report came with three annexes, representing the work of the different Working Groups. These contained a detailed regulatory roadmap,⁸³ a “Strategic R&D Plan,”⁸⁴ and a “study on the societal impact.”⁸⁵ The first annex simply presented a glossy version of the ‘Regulatory Roadmap’ that first appeared in draft form in September 2012.⁸⁶ The second contains an extensive list of research and development that is still required in order to ensure that the technical capabilities match the long-held desire amongst EU

80 European Commission, “Towards a European strategy for the development of civil applications of Remotely Piloted Aircraft Systems (RPAS)”, SWD(2012) 259 final, 4 September 2012, p.17, http://www.statewatch.org/observatories_files/drones/eu/com-2012-09-04-draft-roadmap.pdf

81 House of Commons European Scrutiny Committee, ‘Aviation: remotely piloted aircraft systems’, 31 October 2012, <http://www.publications.parliament.uk/pa/cm201213/cmselect/cmeuleg/86-xviii/8620.htm>

82 http://www.statewatch.org/observatories_files/drones/eu/com-2013-06-roadmap.pdf

83 ‘A Regulatory Approach for the integration of civil RPAS into the European Aviation System’, http://www.statewatch.org/observatories_files/drones/eu/com-2013-06-roadmap-annex-1.pdf

84 ‘A Strategic R&D Plan for the integration of civil RPAS into the European Aviation System’, http://www.statewatch.org/observatories_files/drones/eu/com-2013-06-roadmap-annex-2.pdf

85 ‘A study on the societal impact of the integration of civil RPAS into the European Aviation System’, http://www.statewatch.org/observatories_files/drones/eu/com-2013-06-roadmap-annex-3.pdf

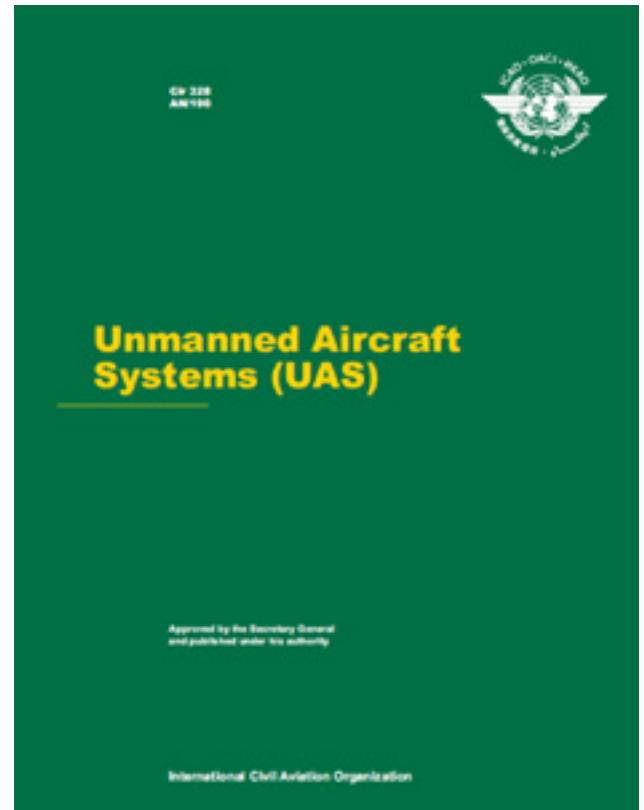
86 European RPAS Steering Group, ‘Regulatory Roadmap’, September 2012, http://www.statewatch.org/observatories_files/drones/eu/ersg-wg-1-roadmap.pdf

officials and industry representatives for the insertion of drones into civil airspace. The ERSG argues that this plan needs to be “integrated into the SESAR Master Plan” and that “all R&D initiatives supporting the safe integration of civil RPAS into the aviation system need to be addressed under the umbrella of the SESAR programme.”⁸⁷ The third annex covers liability, insurance, privacy and data protection, benefits for citizens, acceptable risk, and ethics.

2.6. Going global: EU + USA = ICAO drone standards?

The International Civil Aviation Organisation (ICAO) is a United Nations agency that was established in 1944 “to promote the safe and orderly development of international civil aviation throughout the world.” The body “sets standards and regulations necessary for aviation safety, security, efficiency and regularity... The Organisation serves as the forum for cooperation in all fields of civil aviation among its 191 Member States.”⁸⁸ It has taken an interest in civilian drone regulation since 2005, when it “issued a consultation with selected states and international organisations,” examining present and foreseen civil uses of drones, safety issues, and state procedures for issuing “special operating authorisations for international civil UAS operations.”⁸⁹ The organisation has attracted criticism in the past for acting as a forum for “policy laundering” in relation to the introduction of standards for biometric travel documents.⁹⁰

The 2005 consultation led to the establishment in May 2006 of a “core group” made up of representatives of the states who had responded to the consultation and the always-willing *UVS International*. Just over a year later, the “core group presented their guidance document to ICAO” and “the green light was given in October 2007 by the ICAO Council to start up an ICAO UAS Study Group (UASSG).” According to *UVS International*, this body held its first meeting at the ICAO’s Montreal headquarters in April 2008. Members include the European Commission, representatives of the civil aviation authorities from Australia, Austria, Brazil, Canada, China, Czech Republic, France, Germany, Italy, Japan, Netherlands, Russia, Singapore, South Africa, Sweden, the UK and the USA, as well as international organisations including EASA, the European Organisation for Civil Aviation Equipment (EUROCAE), EUROCONTROL and *UVS International*. Peter van Blyenburgh has acted as the representative of UVSI in the UASSG.⁹¹ The aim of the group is to coordinate “all ICAO UAS related work, with the aim of ensuring global interoperability and harmonisation”; to “develop a UAS regulatory concept and associa-



ted guidance material to support and guide the regulatory process”; as well as coordinating “the development of UAS SARPS [Standards and Recommended Practices] with other ICAO bodies.”⁹²

Two key publications have emerged from the work of the group. One – which is unavailable to the public – is the ICAO RPAS Guidance Manual. The other is ICAO Circular 328 on Unmanned Aircraft Systems. Although it is credited to the Secretary-General of the ICAO, a post by Peter van Blyenburgh in March 2011 on the website *UAS Vision* said that “ICAO, and all the members of the ICAO UAS Study Group, are thanked for their efforts, which made this publication possible... *UVS International* is proud to have been able to contribute to this work.”⁹³ Both documents serve as guidance material for the ICAO in its work on “implementation of basic procedures for operating remotely piloted aircraft (RPA) in non-segregated airspace including detect and avoid.”

This work is being undertaken as part of a process “to modernise civil aviation in the next two decades in four different timeframes identified as ‘Aviation System Block Upgrades’ (ASBU) with four different target dates: 2013 for ASBU ‘0’; 2018 for ASBU ‘1’; 2023 for ASBU ‘2’ and 2028 for ASBU ‘3.’”⁹⁴ It is foreseen that through these, regulatory

87 European RPAS Steering Group, ‘Final report from the European RPAS Steering Group’, June 2013, p.8, http://www.statewatch.org/observatories_files/drones/eu/com-2013-06-roadmap.pdf

88 ICAO, ‘ICAO in Brief’, <http://www.icao.int/Pages/icao-in-brief.aspx>

89 Peter van Blyenburgh, ‘Promoting International Coordination & Cooperation’, June 2012, p.7, http://uvs-international.org/index.php?option=com_flippingbook&view=book&id=3&page=1&Itemid=375

90 The Policy Laundering Project, ‘Policy Laundering Issues at ICAO’, undated, <http://www.policylaundering.org/keyplayers/ICAO-issues.html>

91 Peter van Blyenburgh CV, December 2012, http://www.uvs-info.com/index.php?option=com_docman&task=doc_view&gid=9185&Itemid=219

92 ‘ICAO UAS Study Group’, undated, http://www.uasresearch.com/UserFiles/File/043-44_Contributing-Stakeholder_ICAO-UAS-Study-Group.pdf

93 Peter van Blyenburgh, ‘ICAO Circular 328 UAS Now Published’, *UAS Vision*, 14 March 2011, <http://www.uasvision.com/2011/03/14/icao-circular-328-uas-now-published/>

94 ERSG, ‘A Regulatory Approach for the integration of civil RPAS into the European Aviation System’, June 2013, p.8, http://www.statewatch.org/observatories_files/drones/eu/com-2013-06-roadmap-annex-1.pdf

and technical changes will be introduced gradually, and according to the ICAO’s July 2012 working document on the ASBUs, by 2028 there will be “global readiness” for the widespread civil use of drones with regard to standards; avionics; ground systems; procedures and operations:

The aim is to move from initial accommodation of remotely piloted aircraft (RPA), to integration

*into traffic within non-segregated airspace, and finally to full transparent operation within the airspace. Block 1 is the first step in this process.*⁹⁵

Europe’s drone enthusiasts have seized the opportunity presented by this. The ERSG has aligned its own timetable to the Aviation System Block Upgrade timetable set out by the ICAO.

The EU and the ICAO: converging objectives

Deadline	EU objective (emphasis in original)	ICAO objective
2013	Provide a set of initial common rules to EU Member States (MS) to promote commercial operations of light Remotely Piloted Aircraft Systems (RPAS) in Visual Line-of-Sight (VLOS) and to make possible intra-EU operations	Agree Aviation System Block Upgrades ‘0’
2018	Issue rules for accommodation of the RPAS into civil aviation, including certification of RPAS, personnel competence, RPAS operators and operations for initial IFR/BVLOS (i.e. Beyond VLOS under Instrument Flight Rules) as well as for oversight of communication (COM) service providers. Operations may be subject to limitations, in particular very restricted at aerodromes	Agree Aviation System Block Upgrades ‘1’
2023	Partial integration of RPAS into civil aviation, through common rules for RPA of any weight and alleviation of restrictions/limitations for any RPAS operation and initial mixed (i.e. manned/ RPAS) operations at aerodromes	Agree Aviation System Block Upgrades ‘2’
2028	Full integration of operation of RPAS in non-segregated airspace (controlled and uncontrolled) and at aerodromes, including for commercial air transport of freight/mail or dangerous goods	Agree Aviation System Block Upgrades ‘3’



Meanwhile, the EU has been making bilateral agreements that could see the introduction of more harmonised transatlantic airspace rules before those decided upon at the ICAO. In 2011 the Council of the European Union approved a Memorandum of Cooperation between the EU and the USA on “civil aviation research and development” that allows “the two Parties to address in the future any research and development issue in civil aviation (such as safety, security, environment, performance, alternative fuels, Unmanned Airborne Systems, sub-orbital airplanes etc.)”⁹⁶ Although they are yet to do so, the EU and US have agreed to “develop in the very near future additional Annexes,” which lay out the specificities of cooperation, “in the field of aviation safety, Unmanned Aerial Systems and alternative fuels in aviation.” The only Annex to the EU-USA memorandum agreed so far covers interoperability between the signatories’ next generation of air traffic management systems, a task that in itself includes an agreement to:

⁹⁵ ICAO, ‘Working document for the Aviation System Block Upgrades, the Framework for Global Harmonisation’, 17 July 2012, p.355, http://www.statewatch.org/observatories_files/drones/eu/icao-2012-asbu-working-doc.pdf

⁹⁶ Memorandum of Cooperation Nat-I-9406 between the United States of America and the European Union, OJ L 89/3, 5th April 2011, http://www.statewatch.org/observatories_files/drones/eu/eu-us-2011-memo-coop.pdf

*[C]oordinate on the development of operational methods, procedures, and technology requirements for integrating UAS operations into civil instrument flight rules airspace leading to globally interoperable and common performance solutions. The goal of such coordination shall be ensuring the safe integration of UAS operations in airspace where manned civil operation occur.*⁹⁷

Other work is attempting to ensure that the EU has an eye on all aspects of drone regulation. EU-wide regulations will only apply to those drones weighing above 150kg – anything lighter is the responsibility of national authorities. In order to try and influence decisions made at national level, the Unmanned Aerial Systems in European Airspace (ULTRA) consortium is to “develop a master plan relative to the insertion of remotely piloted aircraft systems in (RPAS) in the European air transport system” with “a strong focus on small RPAS solutions (RPA<150kg)”. However, if the consortium “identifies viable business cases with a positive socio-economic impact for civil RPA with a mass of more than 150 kg, ULTRA will include them in the Civil RPAS Master Plan.”⁹⁸



Partners in the ULTRA consortium – which is funded by the EU's seventh Framework Programme⁹⁹ – include A2Tech (Italy) (a *Finmeccanica* subsidiary); Boeing R&T Europe (Spain); Honeywell (Czech Republic); NLR (the National Aerospace Laboratory of the Netherlands); Studio Legale AST (Italy); Cranfield Aerospace (UK); Indra Sistemas (Spain); Onera (France); Blyenburgh & Co (France); Deutsche Flugischerung (Germany); Integra Consult (Denmark); and Thales Alenia Space (France). ULTRA's activities “will be closely coordinated with the European Commission's RPAS Steering Group”, and it is aiming to provide “an incremental and pragmatic plan for civil RPAS insertion. For each step, the impact on European industry and quality of life will be quantified, and the regulatory and technology needs, as well as the required social acceptance actions will be highlighted.”¹⁰⁰

2.7. “Drone-washing”: the battle for hearts and minds

It is hard to think of a more undemocratic process. For almost ten years, various EU agencies and departments in the European Commission have funded European industry to develop drone technologies and lobby governments and regulators for their introduction. This appears typical of a new breed of “public-private” partnerships in the security field in which the “public” puts up the cash but is otherwise conspicuous only by its absence. It is recognised that “operational use of UAVs is a political decision” and funding for the integration of drones into new air traffic management systems has been inserted into proposed legislation “as a politically driven priority”, yet the European Commission has substituted the democratic process for a technocratic one. The Commission made claims that the publication of the roadmap in June 2013 followed a “three year consultation process”. In effect, this was effect a High-Level conference, a few workshops and a vague Commission Communication that airbrushed most of its preparatory actions from history and which was published only after work had begun in preparation for the June 2013 roadmap and its annexes.

Despite the intrinsically political nature of decisions relating to the insertion of drones into civil airspace, the Commission's Roadmap effectively takes those decisions by circumventing democratic debate entirely. The also allows the Commission to present itself as the neutral arbiter of ‘European integration’. It appear cautious, by proposing a timetable of 15 years; it is limited to civil aviation, enabling the EU to continue to disown military drones as a matter for the member states; it establishes a “strategic research agenda” to legitimise the massive R&D subsidies for drones; and it appears collegiate, promising extensive consultation, in particular on privacy, data protection and fundamental rights issues.

The Commission's staff working paper states that:

*The policy making process supporting the development of civil RPAS applications needs to be transparent and involve the consultation of stakeholders, for example bodies like the European Group on Ethics, the LIBE Committee of the European Parliament or the European Agency for Fundamental Rights and Data Protection Supervisor. Furthermore a range of permissible or forbidden uses of RPAS could be defined to increase the confidence of citizens. Guidelines for certain civil uses of RPAS would be based on a ‘privacy and data protection impact assessment’ and involve interested stakeholders.*¹⁰¹

97 ‘Draft Appendices 1-5 on global interoperability to Annex 1 to the Memorandum of Cooperation on NAT-I-9406 between the United States of America and the European Union’, 10013/1/11, 18 May 2011, http://www.statewatch.org/observatories_files/drones/eu/eu-us-2011-memo-coop-appendix.pdf

98 Peter van Blyenburgh, ‘ULTRA Consortium Kick-Off Meeting’, *UAS Vision*, 12 July 2012, <http://www.uasvision.com/2012/07/12/ultra-consortium-kick-off-meeting/>

99 CORDIS, ‘ULTRA’, http://cordis.europa.eu/projects/rcn/103989_en.html

100 ‘ULTRA Consortium Kick-Off Meeting’, <http://www.uasvision.com/2012/07/12/ultra-consortium-kick-off-meeting/>

101 ERSG, ‘Towards a European strategy for the development of civil applications of Remotely Piloted Aircraft Systems (RPAS)’, SWD(2012) 259 final, p.22-23, http://www.statewatch.org/observatories_files/drones/eu/com-2012-09-04-draft-roadmap.pdf

None of these stakeholders were part of the group that drafted the ERSG's annex on "societal impact".¹⁰² It is regrettable too that the public does not appear to figure in the Commission's plans. Instead of consulting the public, the plan is to condition them into accepting the roll out of drones. One of the aims of the ERSG's Working Group 3 was to work on "measures to increase public acceptance". The group's rapporteur is Professor Alfredo Roma who chaired the "societal dimension" workshop for the Commission's UAS Panel in 2011. Professor Roma was assisted by representatives of EREA (the Association of European Research Establishments in Aeronautics) and the drone manufacture EADS-Cassidian. EREA is also responsible for examining the "level of acceptable risk".

WG3 is advised on privacy and data protection by Anna Masuttia, an insurance lawyer from Bologna University¹⁰³ and the French arms firm Safran. The group also benefits from expertise provided by the European Defence Agency, the European Space Agency, Spanish defence giant Indra, aerospace firm Alenia Aermacchi and Peter van Blyenburgh of UVS International. Of the fifteen participants in the group, only two are listed as having expertise in privacy and/or data protection. The European Group on Ethics, the European Parliament's Civil Liberties Committee, the EU Fundamental Rights Agency and the European Data Protection Supervisor are nowhere to be seen. If the Commission is serious about "consulting" them, why were they not included in the group that drew up the ERSG report that attempts to address privacy and data protection issues?

The document is, notably, the first time that the EU has tried to take seriously the ethical and privacy implications of the widespread introduction of unmanned aircraft into civilian airspace. Previous forays into this arena saw a focus on data protection – rather than the more fundamental issue of privacy – and thus failed to question the legitimacy of data collection via aerial surveillance in the first place. A view on this subject is at least provided in the report on "societal issues". For those authorities interested in deploying drones for the purposes of surveillance, it draws a striking conclusion (emphasis added):

*[W]e can imagine a totally private area called umbra and an area characterized by a lesser degree of privacy called penumbra. **Outside these areas there is the public area where there is no privacy at all.***¹⁰⁴

After recounting international, supranational and domestic conventions and law on privacy and data protection, it comes to a set of recommendations.

Firstly, "RPAS may present a threat to privacy" and so "a broad assessment of privacy threats should be developed" during a process of opinion-gathering from "relevant advisory bodies and broad public" as well as "stakeholders and law enforcement agencies". It is "absolutely necessary to strike a balance between the need to regulate the use of RPAS for data collection and the citizens' right to privacy and data protection." The key point that should guide this consultation process is identified as:

[T]he understanding that the real problems arising from the use of RPAS concern the enforcement of EU law (which is likely to be extremely difficult, in light of the extremely low cost of small RPAS and of the difficulty to track their operations).

Secondly, "video acquisition devices installed on RPAS may present specificities not adequately covered by the current national legal framework". National law across the member states should be analysed to see in which countries "specific law on video surveillance" has been adopted. The Commission should then "[a]nalyse the issue of video surveillance using RPAS with national data protection authorities and produce EC recommendations on the subject".

Thirdly, proposals currently being debated by the Parliament and the Council for a new General Data Protection Regulation and a Police and Criminal Justice Data Protection Directive should be closely monitored:

There is a need to ensure RPAS related issues are well covered in the revised regulation and that opportunities offered by the new regulation (ex [sic] in the area of police applications) are well exploited.

Finally, the Commission should "[p]romote the use of RPAS payloads designed according to the 'privacy by design' standards developed for security technologies under the initiative of the Security unit of DG ENTR". The document argues that this "may contribute to the compliance of RPAS applications with the data protection legal framework".

Given that the first recommendation is for another public consultation, it can therefore be assumed that the UAS Panel process failed as a consultation process with regard to privacy and data protection. While serious engagement with the public on the issue of drones is welcome, the Commission's track record on this issue is hardly impressive, and the note of the need to "strike a balance" between privacy and law enforcement requirements should be of concern to anyone who has followed the EU's record in "balancing" privacy and law enforcement measures.

¹⁰² European RPAS Steering Group, 'Members of the WG3 – Complementary Measures', undated, http://www.statewatch.org/observatories_files/drones/eu/ersg-2012-wg3-members.pdf

¹⁰³ Anna Masuttia has in the past authored articles on the issue of drones alongside Professor Roma, see: 'UAV: The New Challenge Between The European Union And The United States', 5 October 2012, <http://www.mondaq.com/x/199918/Aviation/UAV+The+New+Challenge+Between+The+European+Union+And+The+United+States>

¹⁰⁴ 'A study on the societal impact of the integration of civil RPAS into the European Aviation System', p.20, http://www.statewatch.org/observatories_files/drones/eu/com-2013-06-roadmap-annex-3.pdf

The production of recommendations by the Commission may also be welcome, but will mean little as they will be non-binding and will in any case be overshadowed by the new data protection legislation under discussion. The annex's statement that "opportunities offered" for police use of drones should be "well exploited" also appears to suggest more interest in ensuring that the resulting legislation is permissive, rather than restrictive, with regard to surveillance drones. However, whether the legislation limits the use of aerial surveillance or not, the document itself notes that a key issue in this regard is the enforcement of the law in relation to small and, in particular, privately-operated drones. And while "privacy by design" standards may prove beneficial, it is unclear how – if at all – these could be enforced in any meaningful way.

The document fails to take into account the issue that the widespread availability of drones may well lower the threshold for conducting surveillance operations, and also ignores the implications of attaching payloads other than video cameras or sensors to drones. The potential use of pervasive aerial video surveillance (or other remote sensors) has serious implications for civil liberties and should rightly be a key focus of discussions. However, it is vital to note that drones are not necessarily simply flying cameras – all manner of payloads could be attached. Perhaps the most worrying example is weaponry.

In the US, there are already indications that manufacturers are offering drones armed with both lethal and "less-lethal" weapons to law enforcement authorities,¹⁰⁵ and there have been suggestions that the Predator drones deployed at the US-Mexico border will be armed with "less-lethal" weaponry at some time in the future.¹⁰⁶ The ERSG report neglects such issues. Any future public consultation should take them into account, and the report notes that it is important to understand "which uses envisaged for RPA could be acceptable or not by the Citizens [sic] point of view." However, it is foreseen that opinions on this will come from "institutional European Stakeholders" – some of whom will presumably be those who have been writing drafting roadmaps and funding or undertaking research into all manner of drones through the EU's Framework Programmes for many years (see Chapter 3). It also seems that those backing the widespread introduction of drones into civil airspace are primarily interested in contributions that share the same enthusiasm as they do: "Stakeholders should give their advice in the areas of Ethics and Fundamental Rights,

indicating not only what is 'not possible' but helping in finding ways to make RPA possible."¹⁰⁷

Ultimately, objections appear to be seen as "obstacles". The importance attached to the goal of regular drone flight in civil airspace is made clear in information offered by the Commission to the Council on a proposed new EU Regulation amending the legislation underpinning the entity established to manage SESAR, the SESAR Joint Undertaking. The legislation is due to be revised partially in order to take into account the need for the integration of drones into air traffic management systems (see section 2.3, above): "RPAS ATM integration activities will be part of the extension phase of SESAR."¹⁰⁸ As noted above, the ERSG has recommended that all drone integration R&D activities be incorporated into SESAR. A budget of €70 million has been given to activities geared towards this goal, which was, according to the Commission, "added as a politically driven priority."¹⁰⁹ The European Parliament will have no binding say on the legislation, which will take the form of a Council Regulation.

For some, it is PR which takes priority over public consultation. The report on "societal acceptance" recommends the drafting by "an ad hoc team" of "a strategy to foster public acceptance", and suggests undertaking a survey in order to get information "directly from the public" on "what must be done to gain public acceptance". It is also made clear that it is necessary to "make society familiar" and "aware of the benefits of the insertion."¹¹⁰

Others have been more blunt. In October 2010 Dani Stroli of *Israel Aerospace Industries* gave a presentation to the EU's UAV-NET consortium entitled "the integration of UASs into Civil Airspace: What Does the Public Think?" The challenge, he told his colleagues, was to find ways to "make people perceive UAS technology as a natural part of future society"; to "create positive interest in UASs"; to "quickly and accurately report news concerning UASs"; to "create a strategy to be used in case a UAS accident occurs"; and to "create a multidisciplinary promotional campaign". The *Unmanned Aerial Vehicle Systems Association* in the UK has since "recommended drones deployed in Britain should be shown to "benefit mankind in general", be decorated with humanitarian-related advertisements, and be painted bright colours to distance themselves from those used in war-zones."¹¹¹

105 'Vanguard Shadowhawk', *Special Weapons for Military & Police*, February 2012, <http://www.tactical-life.com/magazines/special-weapons/vanguard-shadowhawk/>

106 'Non lethal weapons on UAS along the U.S borders?', iHLS, 8 July 2013, <http://i-hls.com/2013/07/non-lethal-weapons-on-uas-along-the-u-s-borders/>

107 'A study on the societal impact of the integration of civil RPAS into the European Aviation System', p.36, http://www.statewatch.org/observatories_files/drones/eu/com-2013-06-roadmap-annex-3.pdf

108 European Commission, 'Revision of Council Regulation (EC) No 219/2007 of 27 February 2007 on the establishment of a Joint Undertaking to develop the new generation European air traffic management system (SESAR)', SWD(2013) 262 final, 10 July 2013, http://www.statewatch.org/observatories_files/drones/eu/com-2013-cswd-sesar.pdf

109 European Commission, 'Information note on SJU programme for the period 2014-2020', 14480/13, 7 October 2013, http://www.statewatch.org/observatories_files/drones/eu/com-2013-sesar-info-note.pdf

110 'A study on the societal impact of the integration of civil RPAS into the European Aviation System', p.43, http://www.statewatch.org/observatories_files/drones/eu/com-2013-06-roadmap-annex-3.pdf

111 Ryan Gallagher, 'Surveillance drone industry plans PR effort to counter negative image', *The Guardian*, 2 February 2012, <http://www.guardian.co.uk/uk/2012/feb/02/surveillance-drone-industry-pr-effort>

UAV proponents in and outside of government began by identifying a need for low-cost, basic unmanned aircraft. Once the initial technology was proven, the UAV manufacturers continually and relentlessly improved the capabilities. As a result, UAVs have transformed the way the U.S. government conducts intelligence and military operations. Even the successful operation to uncover and kill Osama Bin Laden relied on intelligence gathered by a stealth UAV. The flexibility, versatility, and low costs of UAVs have resulted in their extension into an amazingly diverse set of tasks...

'Disruptive innovation. Case study: Unmanned Aerial Vehicles', Deloitte, 2012

3. EU-funded drone research

3.1. Summary

The EU funds research and development through its framework research programmes. The previous programme – the seventh, known as **FP7** – has a budget of €51 billion, while the current programme, 'Horizon 2020', launched in December 2013, has some €77 billion. EU funding for drones began in the late 1990s through FP5, and during the course of FP6 and FP7 has gradually increased, in particular with the launch of a dedicated "security" theme under FP7.

More than €315 million has so far been spent in EU research funding on drone technology or drones geared towards a specific purpose such as policing or border control.

The push towards increasing funding for security technologies came in the early years of the 21st century when a public-private 'Group of Personalities' called for greater EU efforts to compete with US firms and technology, and the adaptation of military technologies to civilian purposes. Two other advisory bodies – the European Security Research Advisory Board (**ESRAB**) and the European Security Research and Innovation Forum (**ESRIF**) – were subsequently established, adding to the calls for more security research from numerous industry figures given a dedicated platform from which to address public officials.

Complaints about the domination of advisory groups by industries that stand to benefit from security research funding led to the reform of the ways these groups are organised. But by that point, amongst the hundreds of security research projects, funding for numerous drone-related projects was already in place.

A significant role has been played in many of these projects by the EU's Joint Research Centre (**JRC**), which provides "independent scientific and technological support for EU policy-making". Two of its seven separate research institutes (the Institute for the Protection and Security of the Citizen (**IPSC**) and the Institute for Environment and Sustainability (**IES**)) have taken an interest in drone research, particularly in relation to maritime surveillance and border control.

Border control is one of the key areas for which drones are perceived by EU institutions and industrial firms as a potentially major benefit. The growth in size and powers of Frontex, the EU's border police agency, has contributed to this, as has the development of the European Border Surveillance System (**EUROSUR**), set up in 2008 but only formally approved in October 2013. It is intended that drones will become one many components of this EU-wide border

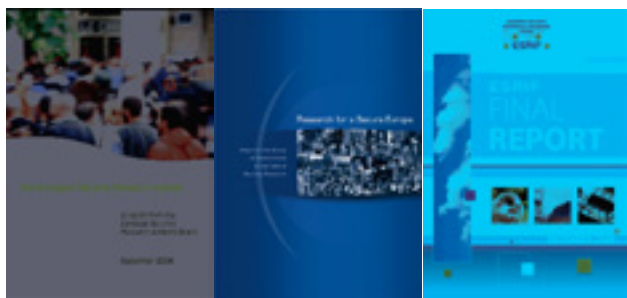
monitoring tool. If and when this happens, FP7 funding will have played a significant role in making it possible.

Drones for policing and internal security have also been recipients of generous FP7 funding. This includes devices intended to “remotely, safely and externally control and stop non-cooperatives vehicles” (the **AEROCEPTOR** project), and to counter the use of drones by terrorists, as well as rather more benign search and rescue applications. Further projects deal with environmental drones, agricultural drones, ocean observation, fire-fighting, and chemical sensing.

Funding for drone projects under Horizon 2020, the successor to FP7, looks likely to increase. The overall budget for security research has grown from €1.4 billion to €3.8 billion, and there is also a push for civil research to be examined and used, if possible, for military purposes as well. Questions over whether the focus on militaristic technology development is desirable or necessary seem to have been side-lined.

3.2. Research for a secure Europe?

The EU’s framework research programme is the biggest single research and development (R&D) budget in the world. The current FP7 programme (2007-2013) has a budget of €51 billion; the next programme, Horizon 2020 (2014-2020) will have a budget of just over €77 billion.¹¹³ The EU began funding R&D into UAV technology in the late 1990s under what was then the FP5 programme which ran from 1993-99.¹¹⁴ The majority of the FP5 and subsequent FP6 (2000-2006) drone grants came from the “growth”, “transport” or “aerospace” budgets. With the launch of the dedicated “security” research programme in the FP7 programme (2007-2013) the amount of funding available for drone R&D increased substantially as the technology was increasingly oriented toward security applications.



This chapter provides an overview of the EU’s drone R&D efforts to date. Our research identified over 90 EU-funded research projects concerned with the development of drone technology or the use of drones for a specific purpose (border control, policing, search-and-rescue, environmental protection etc.). Together these projects received more than €315 million in EU funding. Due to the difficulties in identifying relevant projects from the tens of thousands listed on the **CORDIS** website, the total EU investment to date is likely to be substantially higher.

3.3. Drones and the EU security research agenda

Security became a priority for the EU research programme after the events of 9/11 gave a fillip to the lobbying efforts of an already diversifying defence industry. The development and implementation of the security research programme has been documented in previous *Statewatch* reports.¹¹⁵ The process mirrored that used in the industry-led **STAR 21** initiative (see previous chapter), with a ‘Group of Personalities’ (**GoP**) on security research – including the big four European arms companies – established to set the parameters for the programme.¹¹⁶

The GoP’s report was published in early 2004.¹¹⁷ Its primary concern was that the EU was losing out to the USA in the race to develop ‘Homeland Security’ technologies and that this would leave European security agencies dependent upon foreign technology providers. It would also render European industry unable to compete with their North American counterparts due to the generous subsidies on offer from the Bush administration. The GoP’s report proposed that the EU invest €1 billion per year in security research to “improve the EU’s industrial competitiveness”. In the event, the report’s authors would have to make do with just under €200 million per year for the security research component of FP7, with the same amount again allotted to ‘space research’.

The GoP was also concerned that the EU develop the right kind of “security” by adapting military technologies for use in civilian contexts. This was controversial at the time because the EU was still strictly prohibited from funding military research. In this context drones provided (and continue to provide) the justification for what is clearly “dual use” R&D:¹¹⁸

113 Article 6, ‘Regulation of the European Parliament and of the Council establishing Horizon 2020 – the Framework Programme for Research and Innovation (2014-2020) and repealing Decision No 1982/2006/EC’, 22 November 2013, http://www.statewatch.org/observatories_files/drones/eu/ep-council-2013-horizon-2020-regulation.pdf

114 It is possible that funding commenced earlier but the contractual records published on the CORDIS database do not go back any further.

115 See ‘Arming Big Brother: The EU’s Security Research Programme’, 2006, www.tni.org/archives/reports_militarims_bigbrother and <http://www.statewatch.org/analyses/big-brother.pdf> and ‘Neoconopticon: the EU Security Industrial Complex’, 2009, <http://www.statewatch.org/analyses/neoconopticon-report.pdf>

116 The GoP included the European Commissioners for Research and Information Society, plus, as ‘observers’, the Commissioners for External Relations and Trade, the High Representative for the EU’s Foreign and Security Policy, as well as representatives of NATO, the Western European Armaments Association and the EU Military Committee. Also represented were eight multinational corporations – Europe’s four largest arms companies (*EADS*, *BAE Systems*, *Thales* and *Finmeccanica*), and some of Europe’s largest IT companies (*Ericsson*, *Indra*, *Siemens* and *Diehl*) – along with seven research institutions, including the *Rand Corporation*. See part 2 of ‘Neoconopticon’ for further information.

117 Group of Personalities in the field of Security Research, ‘Research for a Secure Europe’, 2004, http://www.statewatch.org/observatories_files/drones/eu/gop-2004-research-for-a-secure-europe.pdf

118 “Dual-use” technology can be used for both peaceful and military aims. The GoP wanted “research to bridge the gap between civil and traditional defence research, foster the transformation of technologies across the civil, security and defence fields and improve the EU’s industrial competitiveness”.

*Surveillance is needed for the protection of national borders and for crisis management operations abroad. In both cases, the means used to fulfil the capability can often be the same. Unmanned Aerial Vehicles (UAV), for example, can be used for surveillance both by armed forces in crisis management operations and by coast guards to control maritime borders. In each case, the application would be adapted to the specific needs of the customer – in terms of performance, complexity and operational requirements – but the basic technology will probably be quite similar.*¹¹⁹

The thrust of the GoP's report was then reproduced in a European Commission Communication on Security Research in 2004.¹²⁰ The Commission also took the unilateral decision to establish an unprecedented €65 million 'Preparatory Action for Security Research' (PASR) to fund pilot projects, "stakeholder networks" of industry and academic researchers and security agencies, and "high-level" studies on current/future "threats" and appropriate "technology responses".¹²¹

A total of 39 PASR projects were funded between 2004 and 2006; 23 (or 60%) were led by companies that primarily service the defence sector.¹²² The **BSUAV** project – Border Surveillance by Unmanned Aerial Vehicles (UAVs) – was typical. It sought to "understand the problems posed by various types of borders and to define realistic UAV based systems that would answer those problems". Who better to ask than a consortium of drone manufacturers led by *Dassault Aviation*? In 2005 the European Commission established another industry-dominated advisory group – the European Security Research Advisory Board – "to advise [the EU] on the content of the European Security Research Programme and its implementation".¹²³ The ESRAB report set out the five core "mission areas" for security research in FP7 (border security, protection against terrorism and organised crime, critical infrastructure protection, restoring security in case of crisis and integration, connectivity and interoperability). It also managed no less than eight separate references to the increasingly ubiquitous "UAV".¹²⁴ During this period, drone projects with a security angle were also being funded under the FP6 programme, such as the **μDRONES** project, featuring

*Thales, which developed "microdrones" for "monitoring of public and private sites [for] security and surveillance".*¹²⁵⁰

In 2007, with the FP7 security research programme now underway, the Commission established a third advisory body: the European Security Research and Innovation Forum. This group, which was even more industry-dominated than its predecessors,¹²⁶ had a mandate to develop an EU research framework to address "long term threats and challenges", taking a 20 year perspective. The ESRIF "roadmap" on security research was published in 2009. Like ESRAB before it, ESRIF stressed the potential of drones, calling for "certification allowing the use of UAVs in civil airspace" and proposed that EUROCONTROL be tasked with regulation and oversight. ESRIF also urged the EU to use FP7's space research programme for the development of satellite-based navigation and communication systems used by drones (see further chapter 5), noting that:

*Space assets are today key enablers for a wide spectrum of applications. Space services, complemented by other services, notably airborne ones including UAVs, have increased importance, providing critical capabilities in addressing some of the societal challenges that Europe and the world face in the field of civil security, emergency response and crisis management. Consequently, ESRIF has identified the role of space as vital in different security-related technological domains.*¹²⁷

Crucial support for R&D into UAVs also came from the FP7 programme committee which – working with the European Commission and advised by yet another ad hoc expert group, the Security Advisory Group (SAG) – is responsible for the annual calls for proposals. While the core security research areas are set out in the legislation establishing the EU framework research programme,¹²⁸ the programme committee decides on the specific topics and technologies to fund each year. The committee is advised by the SAG.¹²⁹ The 20 members of the SAG were selected by the Commission taking into account the recommendations of the member states; representatives of multinational defence and security contractors again featured prominently.¹³⁰ The process of deciding which topics to include in the annual

119 'Research for a Secure Europe', p.20, http://www.statewatch.org/observatories_files/drones/eu/gop-2004-research-for-a-secure-europe.pdf

120 European Commission, 'Security Research – The Next Steps', COM(2004) 590, 7 September 2004, http://www.statewatch.org/observatories_files/drones/eu/com-2004-security-research-next-steps.pdf

121 See 'Neoconopticon', pp.12-14

122 One third (13) were led by *Thales*, *EADS*, *Fimmeccanica* companies, *SAGEM Défense Sécurité* (part of the *SAFRAN* Group, France) and the *AeroSpace and Defence Industries Association of Europe* (ASD, Europe's largest defence industry lobby group). Together with *BAE Systems* (UK), these companies participated in 26 (67% or two-thirds) of the 39 projects.

123 'Commission Decision 2005/516/EC of 22 April 2005 establishing the European Security Research Advisory Board', http://www.statewatch.org/observatories_files/drones/eu/com-2005-esrab-decision.pdf

124 ESRAB, 'Meeting the Challenge: the European Security Research Agenda', September 2006, http://www.statewatch.org/observatories_files/drones/eu/com-2006-esrab-meeting-the-challenge.pdf

125 See: <http://www.ist-microdrones.org/>

126 'Neoconopticon', pp.15-17

127 ESRIF, 'Final Report', p.33, http://www.statewatch.org/observatories_files/drones/eu/com-2009-esrif-final-report.pdf

128 'Decision No. 1982/2006/EC of the European Parliament and of the Council of 18 December 2006 concerning the Seventh Framework Programme of the European Community for research, technological development and demonstration activities (2007-2013)', OJ 2006 L 412/1, http://www.statewatch.org/observatories_files/drones/eu/ep-council-2006-fp7-decision.pdf

129 European Commission, 'Mandate for the Security Advisory Group for the 7th Framework Programme', September 2009, http://www.statewatch.org/observatories_files/drones/eu/com-2009-mandate-sag.pdf

130 European Commission, 'FP7 Security Advisory Group Membership', November 2010, http://www.statewatch.org/observatories_files/drones/eu/com-2010-sag-membership.pdf

call for proposals has in turn become a huge lobbying exercise, with the member states, Commission DGs, EU agencies, small and large businesses, and academic institutions all seeking to ensure that topics favourable to their ideas and ambitions are included. And with the EU's most powerful member states holding sizeable stakes in Europe's biggest defence companies, there is no shortage of political support for their bidding.

In terms of the democratic control of EU research activities, the process by which the thematic priorities and annual calls for proposals are shaped is thus crucial. In the final analysis one can hardly complain about UAV manufacturers receiving EU funds for the development of drones if that is what is asked for by the national and EU policy-makers responsible for deciding how those funds are used. In preparation for Horizon 2020 the Commission opened up the membership of SAG and other EU research advisory groups to anyone with the requisite experience and expertise and inclination to apply. This initiative followed complaints to the European Ombudsman by the NGO *Corporate Europe Observatory* that EU expert groups were biased toward and dominated by industry interests - complaints which were upheld.¹³¹ The Commission is now under an obligation to prevent potential conflicts of interest and ensure a balanced representation of stakeholders when selecting experts to sit on advisory groups.



3.4. Drones and the EU Joint Research Centre

In addition to its responsibilities vis-à-vis the security research agenda, the European Commission, through its Joint Research Centre (JRC), provides “independent scientific and technological support for EU policy-making” by conducting its own research and participating in EU-funded research projects.¹³² To this end the JRC has established seven dedicated research institutes.¹³³ Two of them – the Institute for the Protection and Security of the Citizen (IPSC) and the Institute for Environment and Sustainability (IES), have taken a particular interest in the development of UAVs. Some of their work is detailed in ‘UAS Applications With Societal Benefits – JRC’s UAS-Related Activities’, published in 2011 by *Blyenburgh & Co.*¹³⁴



Following the launch of the FP7 programme, IPSC launched a dedicated programme on maritime surveillance (**MASURE**),¹³⁵ linking and building on R&D projects dedicated to satellite surveillance (**GMES**,¹³⁶ **LIMES** and **TANGO**) fisheries monitoring (**IMPAST**), ship detection (**DECLIMS**), oil spills (**MONRUK**) and maritime security (**MARISS**, led by the European Space Agency).¹³⁷ IPSC also participates in the key EU-funded R&D projects dealing with border control drones (see following section) and played a “major role” in the **BORTEC** feasibility study for EUROSUR.

In 2010 IPSC carried out its own drone flights in order to test the detection, tracking and classification capabilities of UAVs with regard to small boats at sea. The first, in collaboration with *Finnmecannica's Alenia-Aeronautica*, saw a Sky-Y7 drone (above left) fly from a base in Sardinia to locate an eight metre long rubber boat and a 16 metre fishing vessel identified by satellite imagery; the second used a Hermes 450s (above right) provided by Israel's *Elbit Systems* to track down a vessel southeast of Haifa.¹³⁸ In 2008-9 IPSC's ‘Global Security and Crisis Management Unit’ developed its own prototype UAV for post-disaster mapping “to be used directly in field campaigns, in order to support decision making and relief operations.”¹³⁹

131 Corporate Europe Observatory, ‘Industry Dominates Expert Groups’, 25 March 2008, <http://corporateeurope.org/pressreleases/2008/industry-dominates-expert-groups>

132 European Commission Joint Research Centre, <http://ec.europa.eu/dgs/jrc/index.cfm>

133 These are the Institute for Reference Materials and Measurements (IRMM), the Institute for Transuranium Elements (ITU), the Institute for Energy and Transport (IET), the Institute for the Protection and Security of the Citizen (IPSC), the Institute for Environment and Sustainability (IES), the Institute for Health and Consumer Protection (IHCP), and the Institute for Prospective Technological Studies (IPTS).

134 Joint Research Centre, ‘UAS Applications With Societal Benefits – JRC’s UAS-Related Activities’, http://uvs-info.com/phocadownload/05_3a_2011/P127-P129_Article_JRC.pdf

135 Joint Research Centre, ‘Maritime surveillance at the Joint Research Centre’, undated, http://www.statewatch.org/observatories_files/drones/eu/jrc-20xx-maritime-surveillance-pr.pdf

136 ‘Copernicus’, <http://copernicus.eu/>

137 Unless alternative references are provided, all of the EU-funded R&D projects referred to in this chapter can be found by searching the EU’s CORDIS database: <http://cordis.europa.eu/search/index.cfm?fuseaction=proj.advSearch>

138 ‘UAS Applications With Societal Benefits’, p.1, http://uvs-info.com/phocadownload/05_3a_2011/P127-P129_Article_JRC.pdf

139 Ibid.

The JRC's Monitoring Agricultural Resources (MARS) Unit, part of the Institute for Environment and Sustainability, has a mandate to provide scientific and technical support on EU agriculture and food security policies. Under the Common Agricultural Policy (CAP), farms in receipt of EU subsidies are checked by satellites, drones and GPS systems to ensure that the land is being used in accordance with the policy's stated objectives.¹⁴⁰ This is among various areas in which the MARS unit sees a future for UAVs,¹⁴¹ and according to IPSC staff these pilot projects are just the beginning:

Future JRC UAS related activities, among others, will likely include the continuous fostering, together with stakeholders, of the UAS insertion into European airspace and the investigation of the potential benefits of its use in relevant fields of JRC remit. Other potential lines of research include the study of security related issues, such as communications interference caused by both cooperative and non cooperative agents (jamming, spoofing, etc.) and major threats to the security and safety of using UAS.¹⁴²

3.5. Drones for EU border control

The idea of using drones to help prevent “illegal” immigration has appealed to the architects of the security research programme since its inception. Border control drones have

subsequently received more EU R&D funding than any other kind of drone. The premise is that drones are much cheaper and more efficient than manned aircraft and hence have the potential to increase surveillance of wide maritime areas. Rarely is the question considered of what happens after a drone spots a suspicious vessel – save for when a far-right politician suggests bombing them out of the water.¹⁴³ Nor has the EU been able to develop a credible search-and-rescue policy.¹⁴⁴ In this context it is hardly surprising that people who speak out against the member states' increasingly repressive border controls represent the deployment of drones against migrants as a symbol of Europe's inhumanity.¹⁴⁵



As noted above, the EU began funding border drones under the Preparatory Action for Security Research (2004-6). The €5 million Border Surveillance by Unmanned Aerial Vehicles (BSUAV) project was tasked with presenting a “complete analysis of the potential contribution of the UAV's (Unmanned Aerial Vehicles) to peacetime security

on European borders, both green [land] and blue [sea].” It was led by *Dassault Aviation*, whose CV includes launching Europe's first stealth drone and developing the nEUROn combat UAV (see chapter 4). The PASR also funded the **SOBCAH** (Surveillance of Borders, Coastlines and Harbours) project,¹⁴⁶ led by *Finmeccanica's Galileo Avionica*, tasked with identifying the main threats relevant to “green” and “blue” borders and developing the most suitable architectural solutions, and the **STABORSEC** project,¹⁴⁷ led by French defence and security conglomerate *Sagem*, which developed “an inventory of needed standards for stand-alone equipment used for border security, amongst which was the “transfer of NATO standards for unmanned military platforms” to the “civil domain”.



Source: ‘GLOBE: Phase 1 of the Demonstration Project for the Integrated Border Management System’, presentation by Victor Luaces (Telvent) to European Commission workshop, available at: http://ec.europa.eu/enterprise/newsroom/cf/_getdocument.cfm?doc_id=5119

140 Laurence Peter, ‘Spying on Europe's farms with satellites and drones’, *BBC News*, 8 February 2012, <http://www.bbc.co.uk/news/world-europe-16545333>

141 ‘UAS Applications With Societal Benefits’, p.2; JRC Institute for the Protection and Security of the Citizen, ‘Exploratory Research Projects 2009’, undated, http://www.statewatch.org/observatories_files/drones/eu/jrc-2009-ipsc-research-projects.pdf

142 ‘UAS Applications With Societal Benefits’, p.3

143 ‘Migrant vote call sparks Italy spat’, *BBC News*, 8 October 2013, <http://news.bbc.co.uk/1/hi/world/europe/3175840.stm>

144 ‘Borderline’, pp.15-16, <http://www.statewatch.org/news/2012/jun/borderline.pdf>

145 Smart Smart Borders, ‘Smash Borders III: No Drones against Migrants!’, 28 February 2012, <http://www.smashborders.eu/en/warum-smashborders/21-smash-borders-iii-no-drones-against-migrants>

146 Preparatory Action for Security Research, ‘Surveillance of Border Coastlines and Harbours’, 2006, http://www.statewatch.org/observatories_files/drones/eu/com-2006-pasr-sobcah.pdf

147 Preparatory Action for Security Research, ‘Standards for Border Security Enhancement’, 2006, http://www.statewatch.org/observatories_files/drones/eu/com-2006-pasr-staborsec.pdf

In 2008 the EU member states rubber-stamped the creation of the European border surveillance system, EUROSUR, an ambitious and comprehensive new EU external border surveillance system. EUROSUR promises increased surveillance of the EU's sea and land borders using a vast array of new technologies, including drones, off-shore sensors, and satellite tracking systems.¹⁴⁸ The FP7 programme was subsequently used as a means to develop and demonstrate new technologies for the EUROSUR system. By the time the formal legislation establishing EUROSUR was tabled in December 2011, the EU had invested more than €100 million in R&D projects that directly or indirectly supported EUROSUR's goals. Since the EUROSUR system is coordinated by Frontex (the EU border control agency), there is an expectation that Frontex will enter the drone market in the near future (see chapter 6). If and when Frontex does deploy drones along the EU's borders and in the non-territorial waters beyond, it will be thanks in no small part to the R&D activities carried under the EU security research programme.



Among the first FP7 security projects to receive EU funds were two “roadmaps” on border control technology: **GLOBE** (European Global Border Environment – “the gradual convergence of [...] checks on people, checks on goods, surveillance and police investigation”) and **OPERAMAR** (Interoperable approach to the European Union maritime security management), led by *Thales* and featuring *Indra* and *Finmeccanica*. These projects, funded under the ‘Integrated border management system’ call for proposals,¹⁴⁹ were designed to prepare the ground for larger-scale demonstration projects.¹⁵⁰

The first round of security research funding also provided €12.9 million to a Polish manufacturer of combat robots to demonstrate a “Transportable autonomous patrol for land border surveillance” (**TALOS**). This comprised “a mobile, modular, scalable, autonomous and adaptive system



for protecting European borders” that will “take measures to stop the illegal action almost autonomously with supervision of border guard officers”. *Israel Aerospace Industries* provided the drones. Another €27.4 million went to a consortium led by *Thales* called **WiMA²S** (wide maritime area airborne surveillance), which was funded to “provide the airborne building block of maritime surveillance [...] through the introduction of air vehicles with reduced or zero onboard crew”. “You cannot control what you do not patrol”, asserts the project abstract. Other participants included *Isdefe*, *Dassault Aviation* and *Finmeccanica-Selex*. The project used *Aerovision*'s Fulmar drone, a mini-UAV.

The second call for security research proposals included the development of the EU's “sea border surveillance system” (that is, EUROSUR)¹⁵¹ and “Intelligent surveillance and border security (incl. UAV; secure data link)”.¹⁵² This resulted in four more lucrative and drone-enthusiastic projects.



PERSEUS (the Protection of European seas and borders through the intelligent use of surveillance),¹⁵³ led by Spanish defence giant *Indra*, has received €27.9m to showcase an “EU Maritime Surveillance System of Systems”. *Indra*, *EADS*, *Cassidian*, *Saab* and *Boeing* all feature in a consortium that promises to surpass “EUROSUR's 2013 expectations”. Another €9.9m went to a consortium led by *Selex-Finmeccanica* called **SEABILLA** (Sea Border Surveillance)¹⁵⁴



which aims to “define the architecture for cost effective systems integrating space, land, sea, and air assets”. *BAE*, *Thales*, and *Sagem/SAFRAN* all feature in this initiative. **I2C** (Integrated System for Interoperable sensors and Information sources for Common abnormal vessel behaviour detection and Collaborative identification of threat), led by *DCNS* (a French naval contractor), also received €9.9m. It is working on an “all weather traffic surveillance” system that it claims will be able to “track small crafts” over a “wide maritime zone [of] up to 200 nautical miles” and incorporate data from “deployable sensor platforms” including aircraft and vessel patrols, unmanned submarine vehicles (USVs), and “Zeppelin” airships. The fourth project, **OPARUS** (Open Architecture for UAV-based Surveillance System),¹⁵⁵ received €11.9m to define the “open architecture for the operation of unmanned air-to-ground wide

148 A detailed assessment is contained in the report ‘Borderline’, June 2012, <http://www.statewatch.org/news/2012/jun/borderline.pdf>

149 SEC-2007-3.1-01

150 Frontex had also commissioned two feasibility studies: MEDSEA (Mediterranean Coastal Patrols Network) and BORTEC (EU Border Surveillance System).

None of the final reports have been published

151 SEC-2009.3.2.2

152 SEC-2009.3.4.1

153 <http://www.perseus-fp7.eu/>.

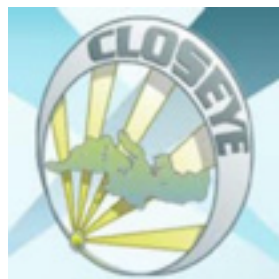
154 <http://www.seabilla.eu/cms>

155 <http://www.oparus.eu/>

area land and sea border surveillance platforms in Europe”. This consortium, led by *Sagem*, features many leading drone manufacturers: *BAE Systems*, *Dassault Aviation*, *CAS-SIDIAN*, *Israel Aerospace Industries*, *Isdefe*, *Onéra*, *Finmeccanica-Selex*, *Thales* etc. Another EUROSUR-related FP7 project, **SUNNY** (Smart UNmanned aerial vehicle sensor Network for detection of border crossing and illegal entry) will begin in 2014.¹⁵⁶ It will use sensors of different kinds of drones to collect real-time information in operational scenarios.



The final security research call of the FP7 programme requested proposals on “surveillance of wide zones: from detection to alert”¹⁵⁷ and “Non-military protection measures for merchant shipping against piracy”.¹⁵⁸ At the time of writing, only one of the successful projects has been unveiled: **CLOSEYE** (Collaborative evaluation of border surveillance technologies in maritime environment by pre-operational validation of innovative solutions).¹⁵⁹ CLOSEYE has received €9.2 million in FP7 funding to surveillance means over the southern Mediterranean, which may include drones, satellites and aerostats over the southern Mediterranean in an attempt to provide the EU “with an operational and technical framework that increases situational awareness and improves the reaction capability of authorities surveying the external borders of the EU”. Although there is clear interest in drones from the CLOSEYE participants, the Commission said in August 2013 in response to a parliamentary question that “the use of RPAS might be considered”.¹⁶⁰ The project is led by the Spanish interior ministry and features *Isdefe*, the EU Satellite Centre and the Italian Space Agency. CLOSEYE is intended to reinforce the SIVE project (*Sistema Integrado de Vigilancia Exterior*, Integrated System for External Surveillance) which monitors the Strait of Gibraltar using radar and surveillance cameras. The *Guardia Civil* has already trialled a number of unmanned air vehicles [UAVs] in recent years, including the *Camcopter S-100* and the *General Atomics Predator*.¹⁶¹



3.6. Police and security drones

Whereas the deployment of drones for border control has coalesced around the high-tech vision/fantasy of com-

prehensive surveillance of the Mediterranean, the development of drones for policing and security purposes has developed in a more *ad hoc* fashion. Indeed the projects funded to date might be said to range from the sublime to the ridiculous. Nevertheless, the same participants crop up again and again.

In response to the 2011 call for proposals for “strategies for countering a terrorist attack in an urban environment”,¹⁶² the EU provided €32.6 million in funding to **ARGUS 3D** (AiR Guidance and Surveillance 3D)¹⁶³ to counter “unpredictable and unexpected terrorist threats, delivered by means of small and low-flying manned or unmanned aircrafts”. The consortium is led by *Finmeccanica-Selex*. While few would dispute the growing potential for cheap drones to be used by terrorists, some might question the scale of the investment into counter-measures for a problem that is both yet to manifest itself and extremely difficult to guard against. This dilemma is reminiscent of the **MANPADS** (man-portable air defence systems) project funded under the EU PASR, part of a failed effort by *EADS* to persuade governments and operators that *all* commercial aircraft should be fitted with technology to thwart a possible surface-to-air missile attack by terrorists.

The 2011 call for security research proposals also requested



“innovative techniques for safe external control of non-cooperative vehicles”.¹⁶⁴ The €3.5 million **AEROCEPTOR** project, led by Spain’s *National Institute for Aerospace Technology*, intends to provide law enforcement agencies with drones that can “remotely, safely and externally control and stop non-cooperative vehicles in both land and sea scenarios”.¹⁶⁵ With this project the EU has arguably crossed the Rubicon from surveillance to interception and threat “neutralisation” (to use the security parlance). In April and August 2013 the Commission provided some details on the project in response to a parliamentary questions. Due to a need for VTOL (vertical take-off and landing) and hover capabilities, “only unmanned helicopters and new tilt rotors or quadcopters” were considered for the project, which will be making use of a Yamaha Rmax drone owned by consortium member *Onera*, at a cost of €200,000. A number of payloads that could be attached to the drone are being considered: “electromagnetic interference to jam engine electronics”; tangle meshes and nets to stop vehicle wheels and boat propellers”; special foam polymers that harden gradually, stopping the vehicle”; “tyre puncturing devices”; and “paint markers and loudspeakers”. Spain’s *Guardia Civil*

¹⁵⁶ http://cordis.europa.eu/projects/rcn/111498_en.html

¹⁵⁷ SEC-2013-1.6-3

¹⁵⁸ SEC-2013.2.4-2

¹⁵⁹ ‘Field testing: CLOSEYE project puts drones over the Mediterranean’, *Statewatch News Online*, 10 May 2013, <http://database.statewatch.org/article.asp?aid=32328>

¹⁶⁰ Answer given by Mr Tajani on behalf of the Commission, 21 August 2013, <http://www.europarl.europa.eu/sides/getAllAnswers.do?reference=E-2013-007499&language=EN>

¹⁶¹ ‘Strait drones tested’, *Gibraltar Chronicle*, 22 April 2013, http://www.chronicle.gi/headlines_details.php?id=28967

¹⁶² European Commission DG Enterprise and Industry, ‘Security Research’, 6 September 2010, http://statewatch.org/observatories_files/drones/eu/com-2010-fp7-call-proposals.pdf

¹⁶³ Argus 3D, ‘The project’, <http://www.argus3d.eu/project>

¹⁶⁴ European Commission DG Enterprise and Industry, ‘Security Research’, 6 September 2010, http://statewatch.org/observatories_files/drones/eu/com-2010-fp7-call-proposals.pdf

¹⁶⁵ <http://www.aeroceptor.eu/>

will “set up operational scenarios and requirements on interoperability/standardisation”.¹⁶⁶



A second project funded under the “non-cooperative vehicles” call is less controversial. **AVERT** (Autonomous Vehicle Emergency Recovery Tool), led by robotics firm *IDUS Consultancy*, has received €2.8 million to develop a prototype to “extract and remove both blocking and suspect vehicles from vulnerable positions such as enclosed infrastructure spaces, tunnels, low bridges as well as under-building and underground car parks”.



The 2011 call for security research proposals also requested “unmanned search and rescue solutions”, with drones seen to offer huge potential for emergency services and security agencies.¹⁶⁷ Three projects were funded. **DARIUS** (Deployable SaR Integrated Chain with Unmanned Systems),¹⁶⁸ led by UK defence conglomerate *BAE Systems*, received €7.5 million to “leverage previous R&D efforts” and adapt them for search-and-rescue. Various land, sea and air drones developed for military purposes but adapted with payloads such as spectrometers (measuring toxicity), sampling systems and infrared cameras feature in the project. **ICARUS** (Integrated Components for Assisted Rescue and Unmanned Search operations), led by Belgium’s drone-enthusiastic Royal Military School, has been awarded €12.6 million in EU funds to “equip first responders with a comprehensive and integrated set of unmanned search and rescue tools [...] to assist search and rescue teams”.¹⁶⁹ Like the DARIUS project, ICARUS is testing a range of land, sea and air drones.



A selection of drones from the DARIUS project.

Two further projects have addressed the potential use of drones for “crisis management” operations. The **HELI-4RESCUE** (Heavy Payload Helicopter for Last Mile Rescue) project is a €1.2 million “support action” led by *Fraunhofer* and featuring *EADS’ Eurocopter*, is geared toward the “deployment in civil missions of systems which are now targeted only for military use”. **AIRBEAM** (AIRBorne information for Emergency situation Awareness and Monitoring) is an €8.9 million project on “situation awareness” using “an optimised set of aerial (unmanned) platforms, including satellites”. AIRBEAM is led by *EADS* whose military-oriented consortium features *Sagem*, *Finmeccanica SELEX*, *Indra*, *Thales*, *Cassidian*, *Dassault Aviation* and *Isdefe*.

¹⁶⁶ ‘Answer given the Mr Tajani on behalf of the Commission’, 12 April 2013, <http://www.europarl.europa.eu/sides/getAllAnswers.do?reference=E-2013-001904&language=EN>;

¹⁶⁷ ‘Answer given by Mr Tajani on behalf of the Commission’, 21 August 2013, <http://www.europarl.europa.eu/sides/getAllAnswers.do?reference=E-2013-007499&language=EN>

¹⁶⁸ European Commission DG Enterprise and Industry, ‘Security Research’, 6 September 2010, http://statewatch.org/observatories_files/drones/eu/com-2010-fp7-call-proposals.pdf

¹⁶⁹ <http://www.darius-fp7.eu/>

¹⁶⁹ <http://fp7-icarus.eu/>

3.7. Every other kind of drone

In addition to the generous funding provided to drone pioneers by the EU security research programme, dozens of drone R&D grants have been provided from other parts of the EU research budget. As noted in the previous chapter, EU support for drone research networks and initiatives began in earnest in 2001 with generous support for consortia of manufacturers through the UAV-NET (thematic Network on UAVs) and CAPECON (safe and low cost UAVs) projects, both led by *Israel Aerospace Industries*. Another “roadmap” for the future of UAVs, this time focussing on “the ever-changing air-traffic management environment”, was produced by the **INOUI** (INnovative Operational UAV Integration) project, which promised both a framework for the operation of UAVs and “a booster for the European UAV industry”.

The EU also supported an International Cooperation Program for Unmanned Aerial Systems between three universities (**ICPUAS**), an International Research Exchange Network (**MUAC-IREN**), a Targeted Intelligent Autonomous Robotics Contest called the “European Roboathlon” (**EURATHLON**), an International Conference on Airborne Research for the Environment (**ICARE-2010**) and the establishment of the **ULTRA** (Unmanned Aerial Systems in European Airspace) network of drone manufacturers (see chapter 2).

As noted above, drones clearly have significant potential for agriculture and environmental monitoring and the EU has funded various projects including **TOAS** and **AGRIC-LASERUAV** (remote sensing and crop management using unmanned aerial vehicles), **HYDROSYS** (environmental monitoring for land management using UAVs), **AMOTH** (environmental monitoring using a fleet of artificial chemosensing moths), **SOME-UFO** (monitoring volcanoes), **IMPACTMIN** (monitoring the impact of mineral resources exploitation), **VINEROBOT** (with various vineyard applications), **SLOPE** (SustainabLe fOrest Production in mountain arEas) and **GROOM** (Gliders for Research, Ocean Observation and Management). R&D into fire-fighting drones (**FIREROB**) and a project looking into the development of “swarms of unmanned assistant robots” to “navigate and search an urban ground” and “warn for toxic chemicals” (**GUARDIANS**) has also been funded.

Seafaring and underwater drones or ASVs (Autonomous Surface Vehicle) and AUVs (automated underwater vehicles) have also featured prominently in EU-funded R&D projects, with the NATO Undersea Research Centre regularly involved. A host of projects were funded in the 1990s including unmanned AUVs (**AUVS**), Robotic Ocean Vehicles (**ASIMOV**), mini autonomous AUVs (**MAUVE**), deep

underwater sampling (**AMADEUS**), autonomous robotic towing systems (**CART**), and a universal docking/recharging system for UAVs (**EURODOCKER**). More recently the EU has funded an underwater coastal sea surveyor (**UNCOSS**), maritime unmanned navigation through intelligent networks (**MUNIN**), augmented reality for remotely operated vehicles (**ARROV**) and underwater robotics research in Croatia (**CURE**).

Remember the jetpack? Personal air transport systems (**MYCOPTER**) and future autonomous air transport systems (**IFATS**) have both EU received funding, as has a self-guided freight container transportation system (**ISTU**, a rail drone?). Micro-drones (**SUAV**, **UECIMUAVS**, and **SAFAR**), hydro-drones (**HYPER**), neuro-drones (**BRAIN-FLIGHT**, **D3COS**), augmented reality drones (**SKYMEDIA**) and smart-drones (**PLANET**) may all be bringing the future a step closer.

Finally, the EU has funded at least 14 generic projects concerned with the navigation, safety, flight, structure, composition and management of drones (**CENTAUR**, **MULTI-POS**, **REFLECT**, **COLLMOT**, **MAS_LAB**, **GREX**, **COMETS**, **AGEN**, **AM10**, **EC-SAFEMOBIL**, **LIVCODE**, **KARYON**, **USICO** and **IFLY**).

3.8. Droning on: towards Horizon 2020

Work is now underway to prepare for the implementation of the new EU framework research programme, Horizon 2020, which runs from 2014 to 2020. Two important political decisions mean that drone R&D is likely to thrive and prosper. First, the money allocated to security research (or “Secure societies – Protecting freedom and security of Europe and its citizens” to give it its new name) has nearly tripled – to just over €3.8 billion,¹⁷⁰ as compared to €1.4 billion over the past seven years. Secondly, while previous EU research programmes had been predicated on the creation of ‘knowledge-based’ societies, Horizon 2020 is – in the light of the current economic climate – to prioritise innovation that strengthens the EU’s “scientific and technological bases” and ensuring that “the conditions necessary for the competitiveness of Union industry exist”.¹⁷¹ Many civil society organisations are concerned that this will see more of the EU’s R&D budget going the way of big business while domains that cannot be ‘monetised’ will be marginalised (see box 2, below). In this context, familiar and self-serving arguments about the growth of Homeland Security markets and the importance of EU competitiveness are likely to be given even more weight in a policy framework now squarely aligned with the needs of industry.¹⁷²

¹⁷⁰ European Commission, ‘Breakdown of the Horizon 2020 budget’, November 2013, http://www.statewatch.org/observatories_files/drones/eu/com-2013-horizon-2020-budget.pdf

¹⁷¹ Preamble, paras. 1 and 2, ‘Regulation of the European Parliament and of the Council establishing Horizon 2020 – the Framework Programme for Research and Innovation (2014-2020) and repealing Decision No 1982/2006/EC’, 22 November 2013, http://www.statewatch.org/observatories_files/drones/eu/ep-council-2013-horizon-2020-regulation.pdf

¹⁷² European Commission, ‘Action Plan for an innovative and competitive Security Industry’, COM(2012) 417 final, 26 July 2012, http://www.statewatch.org/observatories_files/drones/eu/com-2012-swd-action-plan-security-industry.pdf

The Horizon 2020 budget has also come under pressure from pro-enterprise interests to move beyond research and development subsidies to “pre-procurement” agreements, whereby projects would bring them a level of expectation that the equipment and technology being developed by participating companies might later be purchased. The “pre-commercial procurement” (PCP) of research and development already allows public procurers and companies to share the costs of innovation in accordance with EC state aid rules. However, this excludes commercial development activities such as quantity production, supply to establish commercial viability, integration and customisation.

The Horizon 2020 legislation expressly foresees support for “public procurement” and the “procurement of innovative products and services” (PPI), which is when “contracting authorities, possibly in cooperation with additional private buyers, act as lead customer (also called early adopter or launching customer) by procuring ‘innovative’ solutions (not the R&D to develop them) that are newly arriving on the market but that are not yet available on large scale commercial basis due to a lack of market commitment to deploy”.¹⁷³ But these are only expressly envisaged in respect to space and health R&D.¹⁷⁴

A third concept, “pre-operational validation” (POV), was introduced by the European Commission in earlier FP7 calls for security proposals. This assumes that different kinds of surveillance technology can be competitively tested and approved by EU funded R&D projects, with the winning company effectively endorsed for use by public authorities. The CLOSEYE project (above) is the first EU-funded POV project and is evaluating “border surveillance technologies in the maritime environment”, including drones.¹⁷⁵

In discussions on the priorities for the first Horizon 2020 work programme, the European Commission announced its intention to spend a “significant part of the security research budget” on POV, PCP and PPI projects, but there were strong objections by some of the member states, not least on competition grounds. Nevertheless, the direction of travel for the large-scale security innovation projects is clear: an attempt to seek greater “buy-in” from the member states and with it a greater prospect that the research being subsidised will ultimately be implemented.

There has also been ceaseless lobbying geared toward accessing Horizon 2020 funds for military R&D. In his mid-term review of the FP7 programme for the European Parliament’s Committee on Industry, Research and Energy in 2011, Jean-Pierre Audy MEP (a French Christian Democrat and member of the conservative EPP block) proposed:

*[T]hat an ambitious European research plan for technology and defence be adopted between the Union and the Member States and receive significant initial financing from FP7 and the European Defence Agency on the basis of Article 45(d) of the EU Treaty, with a view to enhancing the industrial and technological base of the defence sector while at the same time improving the efficiency of military public spending.*¹⁷⁶

The proposal was not taken seriously but the following year his EPP colleague, Maria Da Graça Carvalho (Christian Democrats, Portugal), in her opinion for the Committee on Industry, Research and Energy on the draft legislative proposal on Horizon 2020, proposed that:

*[C]oordination with the activities of the European Defence Agency will be actively pursued... recognising that there are areas of dual use technology relevant for both civil and military applications.*¹⁷⁷

Calls for greater investment in security and defence and the pursuit of more ‘synergies’ between civilian and military research were further reinforced by two reports adopted by large majorities in the Parliament in November 2013. One called for the strengthening of the ‘European Defence Technological and Industrial Base’ to ensure “strategic autonomy [for Europe] by developing and producing efficient military and security capabilities using the most advanced technologies”,¹⁷⁸ and the other, on the Common Security and Defence Policy, called for the EU and member states to “invest more and step up cooperation in the area of security and defence”.¹⁷⁹ Council Conclusions on the Common Security and Defence Policy agreed in November 2013 invited the European Commission to:

[M]aximise cross-fertilisation between EDA programmes and the outcome of EU civil research programmes in areas of dual use technologies such as, inter alia, RPAS... The Council encourages the

173 FAQ 19: What is the difference/link between PCP and PPI (public procurement of innovative solutions)? ‘Policy related Frequently Asked Questions on Pre-Commercial Procurement (PCP) and the link with Public Procurement of Innovative Solutions (PPI)’, <http://cordis.europa.eu/fp7/ict/pcp/docs/faq-v9.pdf>.

174 Regulation of the European Parliament and of the Council establishing Horizon 2020 – the Framework Programme for Research and Innovation (2014-2020) and repealing Decision No 1982/2006/EC, PE-CONS 67/13, 22 November 2013

175 ‘Considerations on the implementation of the Pre-Operational Validation’, CLOSEYE website, <http://www.closeye.eu/index.php/procurement/90-pre-operational-validation>.
176 European Parliament Committee on Industry, Research and Energy, ‘Draft Report on the mid-term review of the 7th Framework Programme for Research’, 23 February 2011, para. 14, <http://www.statewatch.org/Targeted-issues/ESRP/documents/EP-856282EN.pdf>

177 European Parliament Committee on Industry, Research and Energy, ‘Draft Report on the proposal for a Council decision establishing the Specific Programme Implementing Horizon 2020 – The Framework Programme for Research and Innovation (2014-2020)’, 5 June 2012, http://www.statewatch.org/observatories_files/drones/eu/ep-2012-draft-report-horizon-2020-decision.pdf

178 Committee on Foreign Affairs, ‘Report on the European Defence Technological and Industrial Base’, 29 October 2013, http://www.statewatch.org/observatories_files/drones/eu/ep-2013-edtib-report.pdf

179 Committee on Foreign Affairs, ‘Report on the implementation of the Common Security and Defence Policy (based on the Annual Report from the Council to the European Parliament on the Common Foreign and Security Policy)’, 31 October 2013, http://www.statewatch.org/observatories_files/drones/eu/ep-2013-csdp-report.pdf

*European Commission, the EDA and the EEAS to examine modalities for dual-use capabilities, starting with pilot cases such as RPAS...*¹⁸⁰

A 2009 agreement between the Commission and the European Defence Agency on 'European Framework Cooperation between the security research programme and the EDA' already sees the Commission and the EDA try to coordinate research. The European Commission has also established a 'Defence Industry and Markets Task Force', which explicitly links declining military research budgets to the need to fund dual use technologies from the EU research budget:

It is worth exploring what can be done to limit the impact of the cuts in funding for defence R&D, which is a crucial element of industrial competitiveness. The main objective is to develop greater synergies between dual technologies funded through the different Commission's research programmes and the defence research agenda of the EDA... Perhaps the most obvious area is cyber security as

*one of the few where Member States have kept, or even increased, their budgets. **Other areas could include Unmanned Aircraft Systems (UAS), advanced materials, future and emerging technologies and critical space technologies [emphasis added].***¹⁸¹

Despite these and other defence-industry oriented efforts, the draft provision in Horizon 2020 that "research and innovation activities carried out under Horizon 2020 shall have an **exclusive focus on civil applications**" (emphasis added) survived the negotiations between the EU institutions on the final legislative text.¹⁸² It may mean ultimately mean little in practice, however, because there is very little that can now be done to stop the Commission funding "dual use" military technology in the name of civil security. Indeed, the final legislative text establishing Horizon 2020 states calls for the development of "close synergies" between Horizon 2020 projects and other Union programmes in areas such as space and internal security.¹⁸³

Box 2: Public research should benefit society, not big business

*An Open Letter on the Common Strategic Framework for EU Research and Innovation Funding signed by over 100 European civil society and scientific organisations (June 2011)*¹⁸⁴

The research that is prioritized and funded today will have a decisive impact on the future of our societies and our planet. It is imperative that the EU research framework is geared towards the needs of society and the environment rather than those of big business.

Our societies face immense ecological, social and economic challenges. It is certainly no time for "business as usual", and radical change is needed for society to address these challenges. Research and technology have a crucial role to play, but must - especially when publicly funded - benefit all sections of society.

In these rapidly changing times, research and innovation play a double role: they enable the broadening of knowledge and informed decision-making, but they also contribute to the emergence of problems. Research into nuclear energy, pharmaceuticals, agricultural genetic engineering, synthetic biology, nanotechnologies, space and military research – for example – has seen big business secure generous public subsidies despite widespread concern about their environmental and social impacts. This has marginalized and limited the funding available for research in important domains such as environmental protection, preventative health policy, organic and low-input agriculture, energy-saving and renewable energies, toxicology, water supply issues, and environmentally sustainable fisheries as well as for research in social sciences which contributes to social change and problem solving that are not focused on technological fixes.

Research agendas that prioritize profit and market share are incapable of meeting the social and environmental challenges Europe is facing precisely because these challenges require alternatives to the high-growth, high-profit models of economic development that have been pursued to such devastating excess. European research should promote and focus on innovation that provides solutions rather than investing in end of pipe technologies, which do not tackle the root causes of the problems that society faces.



¹⁸⁰ 'Council Conclusions on Common Security and Defence Policy', 15992/13, 25 November 2013, http://www.statewatch.org/observatories_files/drones/eu/council-2013-csdp-conclusions.pdf

¹⁸¹ Defence Industry and Markets Task Force, 'Non-Paper', undated, p.6, http://www.statewatch.org/observatories_files/drones/eu/com-20xx-dimtf-non-paper.pdf

¹⁸² Article 19(2), 'Regulation of the European Parliament and of the Council establishing horizon 2020 – the Framework Programme for Research and Innovation (2014-2020) and repealing Decision No 1982/2006/EC', 22 November 2013, http://www.statewatch.org/observatories_files/drones/eu/ep-council-2013-horizon-2020-regulation.pdf

¹⁸³ Preamble, para, 32, 'Regulation of the European Parliament and of the Council establishing Horizon 2020 – the Framework Programme for Research and Innovation (2014-2020) and repealing Decision No 1982/2006/EC', 22 November 2013, http://www.statewatch.org/observatories_files/drones/eu/ep-council-2013-horizon-2020-regulation.pdf

¹⁸⁴ 'Public Research should benefit Society, not Big Business', 29 June 2011, <http://www.qcea.org/wp-content/uploads/2011/07/ol-fp8-en-jun-2011.pdf>

We are extremely concerned therefore that the Europe 2020 Strategy and the Innovation Union Flagship Initiative address Research and Innovation almost exclusively from the perspective of competitiveness. It envisages a society driven by technological ‘fixes’ instead of social-policy based solutions and threatens to impose an unacceptable corporate bias in the upcoming next EU framework research programme (2014-2020).

Many of the undersigned organizations, who work on a broad range of social, environmental and economic justice issues, have expressed their concern about the corporate bias in the EU’s current ‘FP7’ research programme. We have highlighted problems such as industry-domination of European Technology Platforms (ETPs) and ‘informal’ agenda-setting bodies like the European Security Research and Innovation Forum. These channels create a structural conflict of interest by allowing industry lobbying to set the EU research agenda and then secure the public funds on offer. The more systematic use of public-private research partnerships envisaged by the European Commission will exacerbate these problems and undermine socially-driven innovation.

While the EU has funded research that seeks to explore and promote alternatives at the margins of its current programme (particularly in its Science and Society programme), we are concerned that these already limited opportunities will be further restricted in the coming programme.

Ethical concerns about many of the controversial technologies the EU is already funding have also been sidelined. The EU’s ethical guidance and compliance mechanisms must be urgently overhauled to ensure that much needed debates about the impact of new technologies can be considered and addressed as part of the overall research agenda. The role of social sciences, particularly, should not be narrowed to facilitating the “acceptability” of technologies.

Research that will make Europe (and the world) an environmentally sustainable, healthy and peaceful place to live must now be prioritised over and above research that delivers marketable technologies. We, the undersigned civil society and scientific organisations, think that another research and innovation policy is not only possible but urgently necessary in order to respond to the challenges our societies are facing. We call on the EU Institutions to take steps to:

- Overcome the myth that only highly complex and cost intensive technologies can create sustainability, employment and well-being, and focus on tangible solutions to environmental, economic and societal challenges instead.
- Ensure that the concept of innovation includes locally adapted and social forms of innovation as well as technological development, and facilitate cooperation and knowledge exchange between civil society organisations and academia in order to realise the innovative potential of the non-profit sector;
- Establish a democratic, participatory and accountable decision-making process for research funding allocation, free from conflicts of interest and industry dominance, and enable civil society to play a full part in both setting the EU research agenda and participating in all EU research programmes;
- Ensure that all experts advising EU research policy-makers are appointed in a transparent manner to provide impartial and independent expertise, free from conflicts of interests; replace industry-dominated advisory groups and technology platforms with bodies that provide a balanced representation of views and stakeholders;
- Ensure that publicly funded research benefits wider society by systematically requiring equitable access licensing and encouraging open source access policies in the next Common Strategic Framework.

3.9. Summary of major UAV-related projects funded under the FP7 programme

Project	Companies involved (selected)	EU contribution (€)
2006		
BSUAV – Border Surveillance by Unmanned Aerial Vehicles (UAVs)	Alenia Aeronautica, Rolls-Royce, SAAB, Thales, Flying Robots	433,000
SOBCAH – Surveillance of Borders, Coastlines and Harbours	Selex, Thales, TNO, Rheinmetal, Indra	2,000,000
2007		
μDRONES – micro DRone autOnomous Navigation and Environment Sensing	Thales, AirRobot	1,900,000
2008		
GLOBE – European Global Border Environment	Skysoft, Altran, GMV Aerospace & Defence, Eurosense, Amper Sistemas, Cogent Systems	1,000,000
OPERAMAR – Interoperable approach to the European Union maritime security management	Thales, Selex, Indra, Quintec, Edisoft	670,000
TALOS – Transportable autonomous patrol for land border surveillance ⁷	PIAP, Defendec, Israel Aerospace Industries	12,900,000
WiMA ² S – Wide Maritime Area Airborne Surveillance	Thales, Eurosense, TNO, Aerovision, Selex, Dassault, Fraunhofer	2,737,000
2009		
ARGUS 3D – AiR Guidance and Surveillance 3D	Fraunhofer, Selex	3,262,000
2010		
SEABILLA – Sea Border Surveillance	Selex, Sagem, TNO, Telespazio, Cassidian, Thales, Indra, Alenia, Eurocopter, Edisoft	9,842,000
I2C – Integrated System for Interoperable sensors and Information sources for Common abnormal vessel behaviour detection and Collaborative identification of threat	DCNS, Deutsche-Zepelin, Airshipvision	9,870,000
OPARUS – Open Architecture for UAV-based Surveillance System	Sagem, EADS, Dassault, ISDEFE, Thales, Selex, BAE Systems, Israel Aerospace Industries	1,188,000
2011		
PERSEUS – Protection of European seas and borders through the intelligent use of surveillance	Indra, EADS, Dassault, ISDEFE, SAAB, DCNS, Boeing	27,848,000
2012		
AVERT – Autonomous Vehicle Emergency Recovery Tool	IDUS, Force Ware, Marshall	2,811,000
DARIUS – Deployable SaR Integrated Chain with Unmanned Systems	BAE Systems, Cassidian, Skytek	7,476,000
ICARUS – Integrated Components for Assisted Rescue and Unmanned Search operations	Fraunhofer, Atos, NATO,	12,585,000
HELI4RESCUE – Heavy Payload Helicopter for Last Mile Rescue	Fraunhofer, Eurocopter	1,048,000
2013		
CLOSEYE – Collaborative evaluation of border surveillance technologies in maritime environment by pre-operational validation of innovative solutions	ISDEFE	9,218,000
AEROCEPTOR – UAV Based Innovative Means for Land and Sea Non-Cooperative Vehicles Stop	PIAP, ISDEFE, Rotem, Israel Aerospace Industries	3,469,000
2014		
SUNNY – Smart UNmanned aerial vehicle sensor Network for detection of border crossing and illegal entry	BMT Group, SAAB	9,570,000
TOTAL		119,827,000

Young military personnel raised on a diet of video games now kill real people remotely using joysticks. Far removed from the human consequences of their actions, how will this generation of fighters value the right to life? How will commanders and policymakers keep themselves immune from the deceptively antiseptic nature of drone killings? Will killing be a more attractive option than capture? Will the standards for intelligence-gathering to justify a killing slip? Will the number of acceptable ‘collateral’ civilian deaths increase?”

Philip Alston (United Nations special rapporteur on extrajudicial, summary or arbitrary executions) and Hina Shamsi (American Civil Liberties Union)¹⁸⁵

4. The EU and military drones

4.1. Summary

European integration and cooperation in defence is supposed to reduce competition and waste amongst national authorities and manufacturers but it is only recently, after years of subsidising competing drone projects, that the development of a genuine “Eurodrone” may be on the cards, and only then because competing European consortia have been simply unable to keep pace with the competition from Israel and the USA.

European companies are desperate to cash in on the rapidly escalating use of both surveillance (MALE, Medium Altitude Long Endurance) and weaponised (UCAV, Unmanned Combat Aerial Vehicles) drones in military campaigns. Although competition among European manufacturers continues with respect to UCAVs, the demand for state subsidies for the development of a single European MALE drone has drawn high-level political backing from across Europe.

Rather than supporting the development of specific types of drone, the EDA has spent much of the time since its launch in 2004 providing significant financial and institutional support to an array of drone projects with both military and civilian applications.

The agency has shown particular interest in research aimed at easing the path of drones into civilian airspace, for example through channelling millions of euros towards projects aimed at developing “line-of-sight and beyond line-of-sight datalinks” for unmanned aerial systems, “sense and avoid” technology that would allow drones to detect other aircraft and change their course so as to avoid collision, and studies on the insertion of drones into civilian airspace.

Our research suggests that at least €190 million of military and civilian drone funding was distributed or managed by the EDA between 2005 and 2011, and that this trend shows no sign of abating. The lack of transparency surrounding EDA operations means it is rarely clear which companies have participated in projects, but amongst the beneficiaries have been major arms manufacturers such as *Thales*, *Selex*, *EADS*, and *Sagem*.

Research projects and programmes have been primarily focused on unmanned aerial vehicles (to the tune of nearly €105 million), but also those intended for use on the ground (over €26 million) or in water (over €47 million).

185 ‘A killer above the law?’, *The Guardian*, 8 February 2010, <http://www.guardian.co.uk/commentisfree/2010/feb/08/afghanistan-drones-defence-killing>

In respect to “unmanned maritime systems”, the EDA is mirroring the work undertaken by research institutions and industry with regard to aerial drones by seeking to establish common rules and regulations that will lead to the wider recognition and deployment of underwater drones.

Many of the EDA’s research and development activities have significant implications for civil liberties and democratic control of new technologies, yet there has been little or no public or parliamentary scrutiny of them. There is no regular, formalised oversight of the EDA by the EU other institutions and the agency fails to fully comply with EU rules on access to official documents, making it even harder for members of the public to investigate and comprehend exactly what the agency is doing and why.



A Predator drone, widely used in military operations by the US Air Force and Central Intelligence Agency.

Photo by Jim Sher: <http://www.flickr.com/photos/blyzz/>

186 ‘EU military spending is ‘elephant in the room’ and key factor in European debt crisis, argues new report’, *Transnational Institute*, 15 April 2013, <http://www.tni.org/pressrelease/eu-military-spending-elephant-room-and-key-factor-european-debt-crisis-argues-new>

187 In Greek mythology, Telemos warned the Cyclops Polyphemos that a man named Odysseus would cause him to lose his sight. What he didn’t tell him was that Odysseus was not the large, bold man Polyphemos was expecting. This led to Odysseus attacking the unprepared Cyclops and successfully blinding him. Clearly, Telemos’ foresight was rather lacking.

188 Giovanni de Briganti, ‘BAE Systems-Dassault Aviation Telemos Revives France’s UAV Wars’, *defense-aerospace.com*, 16 June 2011, <http://www.defense-aerospace.com/cgi-bin/client/modele.pl?shop=dae&modele=feature&prod=126333&cat=5>

4.2. National competition or European integration?

European integration and cooperation in military matters is supposed to reduce competition and waste amongst national authorities and manufacturers. Where the development of drones is concerned it appears that while EU member states are happy to put money into collaborative projects – often using the European Defence Agency as a forum for cooperation – support for domestic or preferred defence contractors has until recently been the overwhelming priority. However, a growing desire to ensure that European companies can supply the equipment needed for European military operations overseas has recently led to proposals for and agreement on cross-border cooperation, through the EDA, on a common European Medium Altitude Long Endurance (MALE) drone.

The EDA is already heavily involved in drone research and development. Nearly €200 million of funding for a plethora of projects has been coordinated by the agency during the last decade. While the research and development of hardware seems primarily geared towards developing components which could subsequently be used in competing national systems, the EDA has invested significant resources in research that will not only boost Member States’ military capabilities, but – in the name of “civil-military synergies” – also smooth the way for the insertion of drones into civilian airspace.

In every case – military or civil, national or European – it is taxpayers that are footing the bill for investments in technology and regulatory initiatives that seemed primarily geared towards the needs of major businesses.¹⁸⁶ The benefits for ordinary people – who remain largely uninformed of the policies and programmes being promoted by secretive and largely unaccountable organisations – are far less clear.

4.3. Cooperation through desperation

With regard to the development of drones, it is only recently that efforts have been made to overcome the prevalence of competition amongst corporations and national authorities. The search for a Medium Altitude Long Endurance (MALE) drone fit for the surveillance and reconnaissance purposes of all European militaries – and potentially civil authorities and private users – was for some time based around a rivalry between *BAE Systems* and *Dassault Aviation* and their *Telemos*¹⁸⁷ drone on the one hand, and *Casidian* (a subsidiary of EADS) and its *Talarion* model on the other. This rivalry was reportedly driven by the belief of both sides that “winning this program would set them on the way to dominate Europe’s UAV industry – and thus its military aviation.”¹⁸⁸

However, in June 2013 *Dassault Aviation*, *EADS* and *Finmeccanica* “called on their governments to... launch a European medium altitude, long endurance (MALE) program” in a “last-ditch attempt to prevent further buys of Predator armed drones from the US.”¹⁸⁹ Such a project has received EU backing. EDA head Catherine Ashton said in October 2013 that there is:

*[A]n urgent need to prepare a program for the next generation of [MALE] RPAS. Such a program will be strongly supported by the development of enabling technologies and other activities (regulation, certification, standardisation) undertaken under civil initiatives, in particular by the European Commission. Horizon 2020 could contribute to the MALE program through development for air insertion and anti-collision under its security dimension, with a potential for surveillance payloads. There is scope for a public private partnership between the Commission, EDA, Member States and industry to develop this capability.*¹⁹⁰

The project will be taken forward by France, Germany, Greece, Italy, the Netherlands, Poland and Spain following approval by the EDA Steering Board in November 2013,¹⁹¹ and subsequently member states’ defence ministers at the European Council meeting in December 2013.¹⁹² EDA official Peter Round commented that the decision was “the starting pistol for us to be able to start work on a European RPAS.”¹⁹³

The Netherlands will lead the programme,¹⁹⁴ which will make up part of a “roadmap on RPAS” also agreed by the November EDA board meeting.¹⁹⁵ The roadmap was initially agreed in April 2013 and includes three other actions dealing with “how to streamline the certification process for military RPAS on the European level,” with common requirements expected by 2018;¹⁹⁶ the launching of a Joint Investment Programme on air traffic insertion designed to “be complementary to the activities of the European Commission in support of RPAS”; and the endorsement of a “Common Staff Target for Medium Altitude Long Endurance (MALE) RPAS as the basis for those Member States which intend to participate in the future.”¹⁹⁷



A Dassault UAV at the Paris Air Show 2011. Photo by Mario Sainz Martínez: <http://www.flickr.com/people/diabloazul/>

189 Giovanni de Briganti, ‘Three European Majors Call for MALE Program’, *defense-aerospace.com*, 16 June 2013, <http://www.defense-aerospace.com/articles-view/feature/5/145868/european-majors-call-for-male-program.html>

190 Catherine Ashton, ‘Final Report by the High Representative/Head of the EDA on the Common Security and Defence Policy’, 15 October 2013, p.17, <http://www.statewatch.org/news/2013/oct/eu-eas-military-plan.pdf>

191 EDA, ‘Defence Ministers Commit to Capability Programmes’, 19 November 2013, <http://www.eda.europa.eu/info-hub/news/article/2013/11/19/defence-ministers-commit-to-capability-programmes>

192 European Council, ‘Conclusions’, 19/20 December 2013, <http://www.statewatch.org/news/2013/dec/eu-council-defence-policy.pdf>

193 Andrew Rettman, ‘Seven EU states create military drone ‘club’’, *EUobserver*, 20 November 2013, <http://euobserver.com/defence/122167>

194 Wendela de Vries, ‘Killer drones for Europe’, *Campagne tegen Wapenhandel*, 5 December 2013, <http://www.stopwapenhandel.org/node/1585>

195 For more on the role of “roadmaps” in EU drone policy, see section 2.3.

196 EDA, ‘Remotely Piloted Aircraft System’, 19 November 2013, http://www.statewatch.org/observatories_files/drones/eu/eda-2013-rpas-factsheet.pdf

197 EDA, ‘Defence Ministers Commit to Capability Programmes’, 19 November 2013, <http://www.eda.europa.eu/info-hub/news/article/2013/11/19/defence-ministers-commit-to-capability-programmes>

Whether the current enthusiasm for cooperation can overcome long standing rivalries remains to be seen. The companies appear to be hedging their bets – they are reportedly “still pursuing different strategies to persuade their national governments to finance their own MALE drones”.¹⁹⁸

EADS originally hoped to win a contract with the governments of France, Germany and Spain for the Talarion. In January 2010 *Cassidian* announced that it may suspend the project if the three states didn't place “concrete orders for the drone.”¹⁹⁹ Reports subsequently emerged that France and Germany would receive six unmanned aerial systems with 18 unmanned aerial vehicles from the project, while Spain would get three systems with nine UAVs (a system comprises three vehicles and a ground control station).²⁰⁰ However, the promised support fell through and *Cassidian* cancelled the project in March 2012 after spending “the past two years unsuccessfully lobbying its now cash-strapped expected customers.”²⁰¹

Cassidian had also attempted to market the *Talarion* to the UK's Royal Air Force, under the guise of “X-UAS”,²⁰² but in July 2010 the company was reportedly driven to “anger and frustration” at the announcement of the rival Telemos

project. This was presented to the British and French governments by *BAE Systems* and *Dassault Aviation*. The signing of the Franco-British defence pact in November 2010 led to an increase in the likelihood of the two governments co-funding a drone project. Following “an initial flurry of activity” progress on the project slowed following the May 2012 election of Francois Hollande, and “both companies have now ceased development.”²⁰³ However, cooperation on next-generation combat drones was recently initiated by the two governments.²⁰⁴

This renewed Franco-British cooperation is indicative of the fact that moves towards EU-based cooperation are yet to emerge in attempts to produce a European Unmanned Combat Aerial Vehicle (UCAV). *Cassidian* is developing the Barracuda with Germany and Spain backing the project,²⁰⁵ and despite a crash in 2008, a number of successful test flights have taken place since, most recently in July 2012 when it flew in conjunction with a Learjet using converted drone technology.²⁰⁶

The Barracuda's key competitor is the awkwardly-titled nEUROn, led by *Dassault Aviation*, with partners from Sweden (*Saab*), Greece (*EAB*), Switzerland (*RUAG Aero-*



The nEUROn drone at Paris Air Show 2011. Photo source: <http://www.flickr.com/photos/guerric/>

198 Giovanni de Briganti, ‘Three European Majors Call for MALE Program’, *defense-aerospace.com*, <http://www.defense-aerospace.com/articles-view/feature/5/145868/european-majors-call-for-male-program.html>

199 ‘Talarion Project in Jeopardy: EADS Warns It May Freeze Drone Program’, *Spiegel Online*, 18 January 2010, <http://www.spiegel.de/international/europe/0,1518,672479,00.html>

200 ‘Talarion MALE Unmanned Air Vehicle (UAV), France’, *airforce-technology.com*, undated, <http://www.airforce-technology.com/projects/talarionuav/>

201 Craig Hoyle, ‘Cassidian calls time on Talarion UAS’, *Flightglobal*, 20 March 2012, <http://www.flightglobal.com/news/articles/cassidian-calls-time-on-talarion-uas-369711/>

202 Craig Hoyle, ‘Cassidian calls time on Talarion UAS’, *Flightglobal*, 20 March 2012, <http://www.flightglobal.com/news/articles/cassidian-calls-time-on-talarion-uas-369711/>

203 Telemos, Talarion, Hammerhead and the Mystery of the European MALE, *Think Defence*, 19 June 2013, <http://www.thinkdefence.co.uk/2013/06/telemos-talarion-hammerhead-and-the-mystery-of-the-european-male/>

204 Chris Cole, ‘UK-French combat drone project gets more funding’, *Drone Wars UK*, 31 January 2014, <http://dronewars.net/2014/01/31/anglo-french-combat-drone-project-gets-more-funding/>

205 Rather bizarrely given its likely usage in combat missions, the *Cassidian* website places information on the Barracuda in its “Public Safety” section. See: *Cassidian*, ‘Barracuda’, http://www.cassidian.com/en_US/web/guest/Barracuda

206 *Cassidian*, ‘Cassidian successfully accomplishes new test flights with Barracuda unmanned technology test bed’, 23 July 2012, http://www.cassidian.com/en_US/web/guest/CASSIDIAN%20successfully%20accomplishes%20test%20flights%20with%20Barracuda

space), Spain (EADS CASA), and Italy (Alenia). In December 2012 it made its first successful test flight in France. Future experimental flights in Sweden and Italy will see tests on “its stealth capabilities and ability to drop precision-guided missiles.”²⁰⁷

There is also the Taranis, a solely British venture named after the Celtic god of thunder and developed primarily by BAE Systems in partnership with Rolls-Royce, GE Aviation, and Qinetiq. The project is jointly funded by the companies involved and the UK Ministry of Defence,²⁰⁸ and in January 2013 it was announced that test flights would take place in Australia and that the eight-ton machine could ultimately be deployed “in the front line of the war on terror in regions such as North Africa and the Middle East.” While ground-based controllers would play a role in operation of the drone – which can “use on-board computers to perform airborne manoeuvres, avoid threats and identify targets” – human crews “will only be consulted to gain authorisation for an attack.”²⁰⁹

The nEUROn project, meanwhile, is managed by the French government and largely funded by the population of France, with the French General Directorate for Armaments (DGA) providing about 50% of the total €400 million in funding.²¹⁰ Other states involved are obliged to provide public money, although the exact amounts are unknown.²¹¹ The Taranis project was originally valued at £124 million, with taxpayers due to provide 75% of the funds;²¹² the contract has since increased to £142.5 million.²¹³ The Barracuda UCAV appears to have a greater amount of financial backing from industrial partners, although some test flights have been backed by German, Swiss and Finnish public funds.²¹⁴

Compared to the very public disagreements that have taken place amongst the backers of the Talarion and Telemos systems, any differences in opinion on the development of three different UCAV systems have remained private. This may be because two of the projects – the Barracuda and the nEUROn – are intended to be technology demonstrators, rather than systems that will be available for ‘off-the-shelf’ usage by governments. Nevertheless, the existence of three separate prototype systems makes clear the extent to which governments are happy to subsidise separate national military systems that could in the future lead to significant sales opportunities for their favoured corporations, as well

as laying the technological basis for the drones that may populate domestic airspace. It also demonstrates that consistent pan-European cooperation in defence investment and research is still a long way from being a reality, despite the continued pleas from EU officials which reached a crescendo in 2013 in the run-up to a December meeting of defence ministers at the European Council.

4.4. Militarising Europe

In July the European Commission published a report citing the importance of the defence industry for jobs, manufacturing and innovation, lamenting the drop in national defence budgets, and arguing that:

*Budgetary constraints must therefore be compensated by greater cooperation and more efficient use of resources. This can be done via supporting clusters, role specialisation, joint research and procurement, a new, more dynamic approach to civil-military synergies and more market integration.*²¹⁵

The Commission noted that it hopes “in particular, to exploit possible synergies and cross-fertilisation which come from the blurring of the dividing line between defence and security and between civil and military” – something that research funded by Horizon 2020 (see chapter 3) will also seek to do. The “action plan” contained within the Commission report set out a number of objectives:

- to strengthen the internal market for defence;
- to promote a more competitive defence industry through “more-co-operation and regional specialisation around and between networks of excellence”;
- exploiting the dual-use potential of research, because “defence research has created important knock-on effects in other sectors... It is important to maintain such spill-over effects”;
- to develop European capabilities;
- to build links between civil and military space activities;
- to cut energy use in the defence sector and armed forces;

207 Duncan Geere, ‘Europe’s first stealth drone, Neuron, takes flight’, *Wired*, 2 December 2012, <http://www.wired.co.uk/news/archive/2012-12/02/neuron-first-flight>

208 BAE Systems, ‘Taranis’, http://www.baesystems.com/product/BAES_020273/taranis

209 Timur Moon, ‘British ‘Superdrone’ Robot plane Could Fly ‘Within Weeks’, *International Business Times*, 27 January 2013, <http://www.ibtimes.co.uk/articles/428334/20130127/taranis-bae-drone-mod-robot-plane-fighter.htm>

210 ‘European Neuron UCAV Kicks Into High Gear’, *HIS GlobalSpec*, undated, <http://www.globalspec.com/reference/16166/121073/european-neuron-ucav-kicks-into-high-gear>

211 Dassault Aviation, ‘An efficient European cooperation scheme’, undated, <http://www.dassault-aviation.com/en/defense/neuron/an-efficient-european-cooperation-scheme/>

212 Craig Hoyle, ‘FARNBOROUGH: UK’s Taranis UCAV breaks cover’, *Flightglobal*, 19 July 2010, <http://www.flightglobal.com/news/articles/farnborough-uks-taranis-ucav-breaks-cover-344439/>

213 BAE Systems, ‘Taranis: informing the future force mix’, December 2011, http://www.baesystems.com/cs/groups/public/documents/document/mdaw/mdm4/~edisp/baes_026383.pdf

214 Chris Pocock, ‘EADS Forges Ahead with Barracuda UCAV Trials’, 21 September 2012, <http://www.ainonline.com/aviation-news/ain-defense-perspective/2012-09-21/eads-forges-ahead-barracuda-ucav-trials>

215 European Commission, ‘Towards a more competitive and efficient defence and security sector’, COM(2013) 542 final, 24 July 2013, http://www.statewatch.org/observatories_files/drones/eu/com-2013-communication-defence-security-sector.pdf

and

- to ensure international competitiveness.

This was followed in October by a call from EDA head and EU foreign policy chief Catherine Ashton for Europe to “develop the full range of its instruments, including its security and defence posture”, of which the development of a European MALE drone (see above) was merely one aspect. It also necessitates acting “decisively through CSDP [Common Security and Defence Policy] as a security provider” and through “projecting power”, as well as building the ability to “engage in all 5 environments (land, air, maritime, space and cyber).” Ironically, Ashton backed up her calls for more defence spending by citing a report by the Stockholm International Peace Research Institute. The Institute noted that global defence spending is shifting “from the West to the rest”. Ashton’s report also invoked the now-familiar mantra that “there is considerable potential for synergies between civil and defence research.” In order to “live up to its role as a security provider”, it argued, “European citizens and the international community need to be able to trust and rely on the EU to deliver when the situation demands. We must move from discussion to delivery.”²¹⁶

The argument for overcoming the effects of declining defence budgets through greater European cooperation was subsequently backed up by the European Parliament’s European Added Value Unit, which in December published a report on the “cost of non-Europe” in security and defence matters. This argued that the financial costs of national, fragmented European military structures and industries – the “price to be paid for operating at a national rather than European level” – added up to more than €25 billion.²¹⁷ As noted in chapter 3, MEPs have also made strident calls for more EU support for and involvement in military and security research, production, and deployment. In November 2013 the parliament adopted two reports drafted by the Foreign Affairs Committee on the European Defence Technological and Industrial Base (EDTIB)²¹⁸ and the Common Security and Defence Policy.²¹⁹ Both were countered by a small number of MEPs sitting on the Foreign Affairs Committee who tabled minority opinions²²⁰ on the grounds that the reports advocated the further militarisation of the EU:

The report [on the EDTIB]... implicitly suggests to increase defence budgets, encourage arms exports and to foster the development of a European Military-Industrial-Complex (MIC) by establi-

shing a European defence market, to extensively use European budgets to finance military aspects and to increase armaments cooperation especially via pooling and sharing.

The opinions called for “strict separation of civil and military capabilities” and a “civilian EU, strict civil peaceful conflict approaches, separation of civil and military actions, military expenditure redirected to civilian purposes”.

The opposite approach was taken by EU member states’ defence ministers at the December 2013 European Council meeting. Lamenting “constrained” national military budgets that limit “the ability to develop, deploy and sustain military capabilities” and “fragmented European defence markets” that “jeopardise the sustainability and competitiveness of Europe’s defence and security industry”, they called for member states to:

[D]eepen defence cooperation by improving the capacity to conduct missions and operations and by making full use of synergies in order to improve the development and availability of the required civilian and military capabilities, supported by a more integrated, sustainable, innovative and competitive European Defence Technological and Industrial Base (EDTIB). This will also bring benefits in terms of growth, jobs and innovation to the broader European industrial sector.

Alongside the development of a European MALE drone, the defence ministers approved demands for “more flexible and deployable EU Battle groups”, the development of “an EU Cyber Defence Policy Framework”, an increase dual-use civil-military research, and “further strengthening cooperation to tackle energy security challenges”. Much of this work will fall under the remit of the European Defence Agency.

4.5. The European Defence Agency and drones

The EDA has taken a strong interest in drones since its launch in 2004. The Agency’s 2005 Work Programme outlined a number of “flagship” projects, of which one was ‘Unmanned Air Vehicles’ (the other two were ‘Command, Control and Communication’ and ‘Armoured Fighting Vehicles’).²²² Since 2005, the EDA has overseen projects for unmanned aerial, ground and maritime vehicles with a total value of over €190 million. Our research has identified 39 projects

216 Catherine Ashton, ‘Final Report by the High Representative/Head of the EDA on the Common Security and Defence Policy’, 15 October 2013, p.2, <http://www.statewatch.org/news/2013/oct/eu-eas-military-plan.pdf>

217 European Added Value Unit, ‘Cost of Non-Europe Report’, December 2013, http://www.statewatch.org/observatories_files/drones/eu/ep-2013-cone.pdf

218 Committee on Foreign Affairs, ‘Report on the European Defence Technological and Industrial Base’, 29 October 2013, http://www.statewatch.org/observatories_files/drones/eu/ep-2013-edtib-report.pdf

219 Committee on Foreign Affairs, ‘Report on the implementation of the Common Security and Defence Policy (based on the Annual Report from the Council to the European Parliament on the Common Foreign and Security Policy)’, 31 October 2013, http://www.statewatch.org/observatories_files/drones/eu/ep-2013-csdp-report.pdf

220 The minority opinions are affixed to the two reports of the Committee on Foreign Affairs, see footnotes 216 and 217.

221 European Council, ‘Conclusions’, 19/20 December 2013, <http://www.statewatch.org/news/2013/dec/eu-council-defence-policy.pdf>

222 ‘Report by the Head of the European Defence Agency to the Council’, 17 May 2005, 8967/05, p.4, http://www.statewatch.org/observatories_files/drones/eu/eda-2005-report-head-to-council.pdf

undertaken through the EDA between 2005 and 2011 aimed at developing technology or regulatory standards to benefit the production of military drones – whether for air, land or sea – and to drive the insertion of drones into civilian airspace. The latter goal is increasingly being pursued through intensified cooperation with other institutions such as the European Commission, the European Space Agency (see following chapter), the European Aviation Safety Agency²²³ and EUROCONTROL.²²⁴ Furthermore, in early 2013 a new €5 million Joint Investment Programme was launched of which several research themes are likely to be of use for drone technology development.

The biggest proportion of money overseen by the EDA (nearly €105 million) has been spent on projects geared towards unmanned aerial systems. While many of the projects are military in nature, significant resources have gone into the development of technology and regulatory structures that will ease the path of drones into civilian airspace. However, the dividing line between civil and military technology in the field is somewhat blurred, a point increasingly made by those drone enthusiasts arguing for making better use of civil-military ‘synergies’. Since 2009 the EDA has also invested in research and development for land-based drones (projects worth over €26 million) and sea-based drones (over €47 million). A further €13 million has gone into projects whose purpose is either not entirely clear, or varied.

With public money being used to pump-prime the apparently enormous market for civilian drones, the mantra that such technological developments will “benefit the citizens” is frequently employed as a justification. But the lack of democratic input into and oversight of the EDA’s work means that, as with the work undertaken by the Commission detailed in chapter 2, no one has ever really asked those who are supposed to benefit exactly what they think about the more widespread introduction into society of unmanned drones, whether on land, in the sea, or in the skies.

4.6. Transparency and accountability

The EDA is the only EU agency with a basis in the Lisbon Treaty. Article 42(3) of the Treaty states that “Member

States shall undertake progressively to improve their military capabilities,”²²⁵ and that the EDA shall assist with this. The Agency has a mandate²²⁶ to identify Member States’ military capabilities (for Common Foreign and Security Policy, CFSP missions) and monitor capability commitments; promote harmonisation and effective procurement methods; manage multilateral programmes on military capabilities; support defence technology research and joint research activities; and strengthen “the industrial and technological base of the defence sector” and “the effectiveness of military expenditure.”²²⁷

The EDA therefore has the twin role of refining, enhancing and developing European military capabilities, and boosting the European arms industry, although opinions are mixed when it comes to the question of how effective it is. One assessment of the Agency in 2009, on the fifth anniversary of its founding, stated that “its achievements can certainly not be called spectacular... [but] the EDA has shown more potential than its predecessors.”²²⁸ It is able to undertake significant projects for the armed forces of the Member States, as well as acting as a forum for cooperation between Member States. The EDA is frequently considered by its supporters as being under-utilised, and a common argument of proponents of stronger EU military capabilities is that due to cuts in defence funding, Member States “will have no other choice but to invest more together and to seek civil-military synergies.”²²⁹

There is little room within the EDA’s decision-making processes for wider accountability to the European populace. Catherine Ashton is the head of the Agency (as well as being High Representative of the Union for Foreign Affairs and Security Policy) and chairs the Steering Board, which is made up of one representative of each participating member state (all EU member states except Denmark), and one representative of the Commission. The Steering Board is comprised at the highest level of EU member states’ defence ministers, and convenes twice a year. Other, sub-ministerial formations – made up, for example, of armaments directors or capability directors – meet more regularly. At Steering Board meetings, unanimity is required for decisions taken on the Agency’s role, goals and targets, while qualified majority voting²³⁰ is used to make decisions on

223 EDA, ‘EASA & EDA: Civil-Military Cooperation in Aviation Safety’, 19 June 2013, <http://eda.europa.eu/info-hub/news/2013/06/19/easa-eda-civil-military-cooperation-in-aviation-safety>

224 EDA, ‘EUROCONTROL and European Defence Agency Strengthen Military Dimension of European ATM’, 20 June 2013, <http://eda.europa.eu/info-hub/news/2013/06/20/eurocontrol-and-european-defence-agency-strengthen-military-dimension-of-european-atm>

225 Article 42(3), Lisbon Treaty, Section 2, Provisions on the Common Security and Defence Policy. The Agency’s original legal basis was Joint Action 2004/551/CFSP, but the legislation redrafted following the entry into force of the Lisbon Treaty.

226 Council Decision 2011/411/CFSP of 12 July 2011 defining the statute, seat and operational rules of the European Defence Agency and repealing Joint Action 2004/551/CFSP, http://www.statewatch.org/observatories_files/drones/eu/eda-2011-council-decision.pdf

227 Article 5, ‘Functions and tasks’, Council Joint Action 2004/551/CFSP of 12 July 2004 on the establishment of the European Defence Agency, http://www.statewatch.org/observatories_files/drones/eu/eda-2004-council-joint-action.pdf

228 Frank Slijper, ‘Potentially powerful: the European Defence Agency at five years’, October 2009, <http://www.tni.org/article/potentially-powerful-european-defence-agency-five-years-0>

229 Alexander Weis, ‘Improving capabilities for ESDP’s future needs’ in Álvaro de Vasconcelos (ed.) *What ambitions for European defence in 2020?*, p.115, http://www.iss.europa.eu/uploads/media/What_ambitions_for_European_defence_in_2020.pdf

230 Under qualified majority voting or QMV votes are weighted in accordance with the size of the population of the country represented by the voting minister.

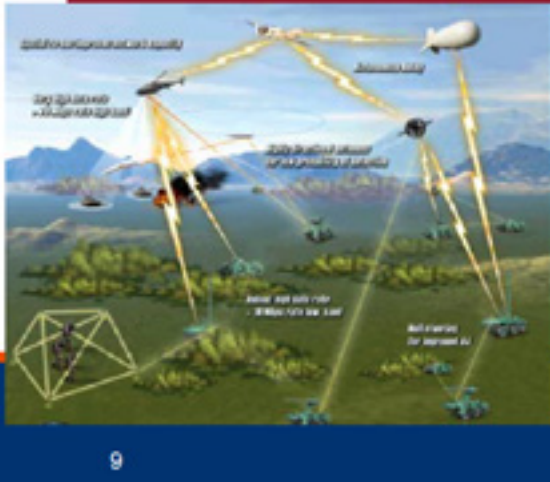
231 Council working parties such as the Political and Security Committee are able to offer “advice”, along with “other competent Council bodies as appropriate”. Relations with Council working parties have included the EDA making presentations to the Terrorism Working Party on its work to counter improvised explosive devices, and discussions with the Law Enforcement Working Party on the issue of radio frequency allocation.



Future



Information => customer



The future, according to a presentation given by the Dutch police at the European Commission's 2010 'High-Level Conference': networked surveillance systems, including drones that look like insects.

internal operations. The Steering Board is subordinate to the Council of the European Union, with lays out annual guidelines for the Agency's work.²³¹

There is no regular parliamentary oversight of the Agency. Members of the European Parliament are occasionally informed of the activities of the EDA by the head of the Agency, most recently in June 2013.²³² However, while such meetings may keep MEPs abreast of the work of the Agency, there is little they can do to influence, alter or censure work, projects or operations they may deem unacceptable or worthy of greater scrutiny. National parliaments also play a role in scrutinising the EDA's work, but they have no formal input into policymaking or powers of censure either. In the UK, the House of Commons European Scrutiny Committee has remarked of this process that:

With regard to the Council Guidelines for the Agency's Work in 2012 and the Three-Year Financial Framework 2012-2014 and 2012 Budget, it is interesting to receive the [UK Defence] Minister's views. But he has the advantage of us: he has seen the documents in question, whereas – despite se-

*veral fruitless requests at official level – we have not... [T]he delays both this year and last suggest, at best, indifference on the part of the EDA secretariat towards the essential role of parliamentary scrutiny in Common Security and Defence Policy, and is unacceptable.*²³³

Information on the EDA's work available via its website is limited and incomplete. Minutes of Steering Board meetings, made available following formal requests, are relatively detailed, but comments and interventions are not attributed to a particular Member States: phrases such as "one" or "some" are substituted for the name of the state(s) in question. This further limits the ability of individuals – if they have the time and energy to obtain the relevant documents in the first place – to know what actions their governments are taking when participating in EDA meetings. With no public register of documents and no mention on its website of EU transparency legislation, the Agency also fails to comply fully with its requirements under Regulation (EC) 1049/2001 on public access to documents, further limiting the ability of ordinary people to gain more detailed insight into the Agency's work.

231 Council working parties such as the Political and Security Committee are able to offer "advice", along with "other competent Council bodies as appropriate". Relations with Council working parties have included the EDA making presentations to the Terrorism Working Party on its work to counter improvised explosive devices, and discussions with the Law Enforcement Working Party on the issue of radio frequency allocation.

232 EDA, 'Exchange of Views with SEDE Members', 10 June 2013, <http://www.eda.europa.eu/info-hub/news/2013/06/10/exchange-of-views-with-sede-members>; European Parliament Subcommittee on Security and Defence, 'Minutes, Extraordinary meeting of 3 June 2013', http://www.statewatch.org/observatories_files/drones/eu/ep-2013-sede-minutes.pdf

233 House of Commons European Scrutiny Committee, 'Sixty-first Report of Session 2010-12', p.40, http://www.statewatch.org/observatories_files/drones/eu/hoc-2012-european-scrutiny-report.pdf

4.7. EDA research projects

The EDA has, since its establishment, invested millions of euros and a significant amount of time and effort in projects that seek to rectify the perceived ‘problem’ of the inability of drones to operate outside segregated airspace. Airspace deemed “segregated” is designated for military use and subject to differing controls and legislation than civil airspace. It is precisely this segregation that drone enthusiasts wish to overcome in order to ensure maximum freedom for drone flights in European skies. In recent years the Agency has been joined by European Commission (EC), the European Space Agency (ESA), the European Aviation Safety Agency (EASA) and EUROCONTROL, both through bilateral agreements and through the European Framework Cooperation programme, an effort intended to “systematically ensure complementarity and synergy of defence R & T [research and technology] by the EDA with research investment for civilian security and space by the EC... and by the ESA”.²³⁴



The first EDA contract related to drones was signed in 2005, and involved a study led by the Finnish firm *Patria Oyj* on the development of “line-of-sight and beyond-line-of-sight datalinks” for unmanned aerial systems. Around the same time, agreement was reached on a study that would investigate the development of a ‘sense and avoid’ system that would allow unmanned vehicles to detect other aircraft, and change their path so as to avoid collision. The safety record of drones is not particularly impressive, and rectifying these problems is a necessity before their insertion into civilian airspace.²³⁵ Both these contracts were worth more than €700,000 and the projects were the two most expensive financed from the 2005 budget, with their collective costs of nearly €1.5 million constituting a significant chunk – nearly 10% - of the EDA’s expenditure that year of €16.2 million.²³⁶

Expenditure between 2005 and 2009 increased massively, and in 2010 and 2011 dropped somewhat – although both these years saw an increase in spending into research and development on unmanned sea and land systems. In 2007, two ‘UAV Simulation Testbeds’ with a total cost of €995,000 were arranged and a €500,000 project entitled ‘UAV Insertion into General Air Traffic’ began. This contract was won by the Air4All consortium led by ASD (the *European Aerospace and Defence Manufacturers Association*, the lobby group of Europe’s major arms companies). UVS International played a significant role in establishing the consortium (see chapter 2).

In 2009, over €60 million of funding was also awarded to the **MIDCAS** (Mid Air Collision Avoidance System) project, due to last some four years with the aim of demonstrating:

[T]he baseline of solutions for the Unmanned Aircraft System (UAS) Midair Collision Avoidance Function (including separation), acceptable by the manned aviation community and being compatible with UAS operations in non-segregated airspace by 2015.

In short: trying to make drones safe enough to fly them on a regular basis near populated areas. Sweden is leading the project, which also involves Germany, France, Italy and Spain, alongside a “who’s-who” of European defence contractors: *Thales, Diegl, Safran, Cassidian, Indra, Selex*, and SAAB amongst others.

Major expenditure in 2010 saw over €40 million awarded to a project on unmanned maritime systems, led by France in cooperation with Belgium, Finland, Germany, Italy, Norway, Netherlands, Poland, Portugal, Spain and Sweden. Spending on aerial drones was less extravagant, although €249,400 went to the E4U project (“support to the scoping and prioritisation of topics for launching of a European Framework Cooperation on Unmanned Aerial Systems”),²³⁷ a €400,000 study on “the future of the European military aerospace defence”, and just under €50,000 for “UAS Awareness Campaign: creation and production of UAS video.”

The EDA announced in January 2013 its ‘Second Joint Investment Programme on Innovative Concepts and Emerging Technologies’. Austria, Germany, France, Italy, Luxembourg, the Netherlands, Poland and Sweden are providing €5.2 million for joint research that is:

²³⁴ EDA Factsheet – European Framework Cooperation for Security and Defence Research, p.1, http://www.statewatch.org/observatories_files/drones/eu/eda-2009-efc-factsheet.pdf

²³⁵ David Zucchino, ‘War zone drone crashes add up’, *Los Angeles Times*, 6 June 2010, <http://articles.latimes.com/2010/jul/06/world/la-fg-drone-crashes-20100706>; ‘Pilots worry about safety of allowing domestic drones in US skies’, *MSNBC*, 7 February 2012, http://usnews.msnbc.msn.com/_news/2012/02/07/10344710-pilots-worry-about-safety-of-allowing-domestic-drones-in-us-skies; see also the ‘Drone Crash Database’ maintained by Drone Wars UK at <https://dronewarsuk.wordpress.com/drone-crash-database/>

²³⁶ EDA, ‘2005 Financial Report’, p.23, http://www.statewatch.org/observatories_files/drones/eu/eda-2005-financial-report.pdf

²³⁷ E4U is short for EREA 4 UAS, in turn short for European Research Establishments in Aeronautics for Unmanned Aerial Systems. See: Association of European Research Establishments in Aeronautics, <http://erea.org/>

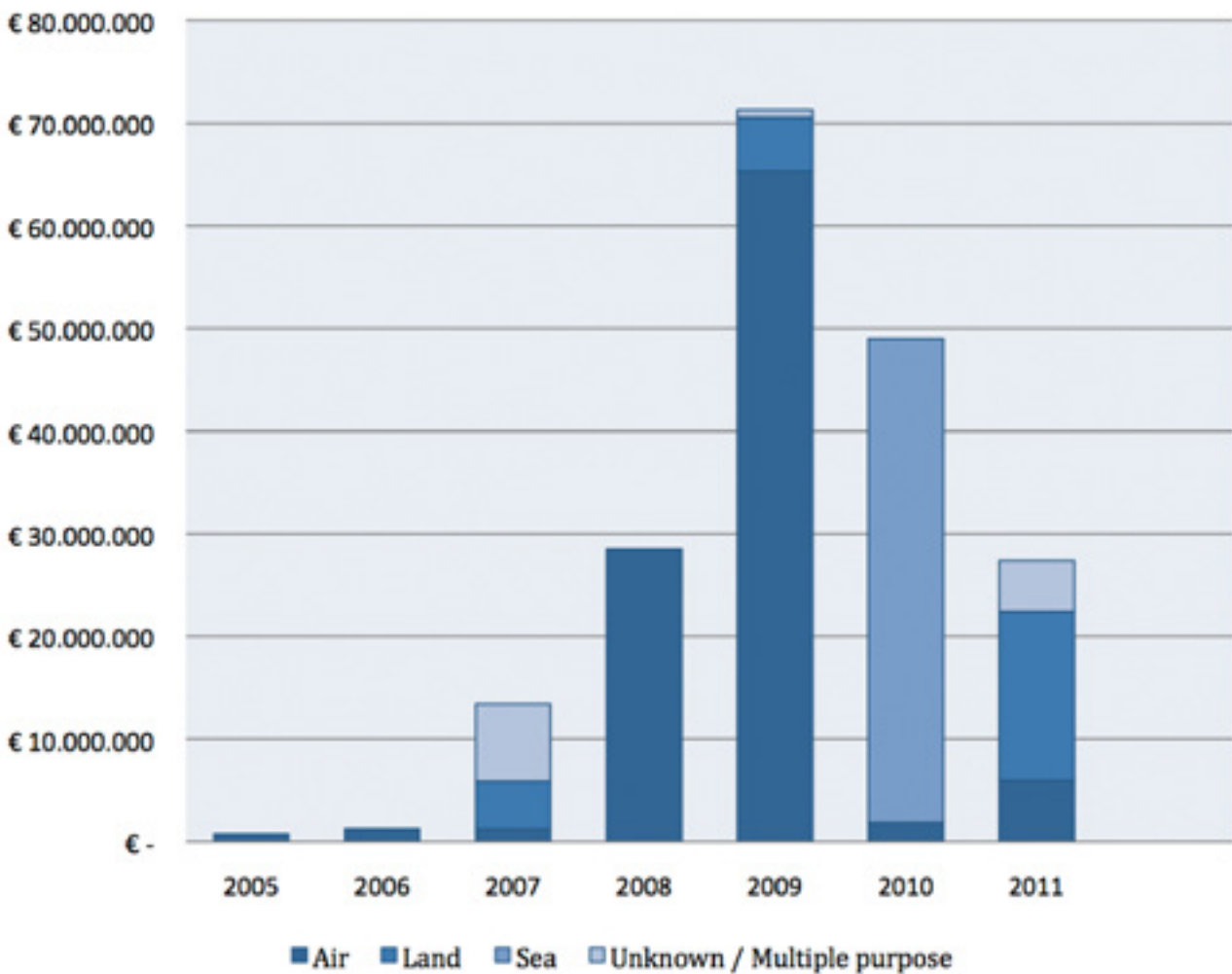
*[E]xpected to offer high potential for technological breakthroughs that will contribute to the achievements of future military capability requirements and improve the competitiveness of European defence industry.*²³⁸

Four of the eight research themes are aimed directly or indirectly at drone technology. ‘AI driven systems for Data & Information Fusion’ will examine “the new developments of the data and information fusion, based on recent advance in Artificial Intelligence” and their uses in military contexts; ‘Energy Storage Technologies’ will examine innovation in supplying power to military vehicles and equipment including “UUV autonomy” and “UAV power sources”; ‘Active Controls for Flow and Mixture of Gases’ will look at “integration of active controls for flow and mixture of gases in the aircrafts, missiles and UCAV for stealth applications”; and ‘Space Environment’ will examine “the impact of radiation [in outer space] on materials and systems”.²³⁹

Drones received a further boost when in April 2013 the EDA Steering Board agreed on a ‘Pioneer Project’ examining air traffic insertion, RPAS certification, a future EU MALE drone, and EU member state military cooperation – the seven-nation “drone club” approved in November 2013, noted above. Pioneer Projects are “promoted by the EDA to harness synergies in the military and civil domains, maximise dual-use technologies, [and] generate economies of scale”.²⁴⁰ The cost of the projects is currently unknown.

Not all of this money for these projects comes from the Agency’s own funds. The work of the EDA is undertaken on a relatively small budget of about €30 million per annum, and the vast majority of the money comes directly from Member States, and appears in the EDA’s financial reports due to the use of the Agency by member states as a forum for cooperation.

EDA expenditure on drones 2005-2011, divided by system type



238 EDA, ‘R&T: Innovative Concepts and Emerging Technologies’, 1 February 2013 <http://eda.europa.eu/info-hub/news/2013/02/01/r-t-innovative-concepts-and-emerging-technologies>

239 EDA, ‘Second Joint Investment Programme on Innovative Concepts and Emerging Technologies (ICET 2)’, 30 January 2013, http://www.statewatch.org/observatories_files/drones/eu/eda-2013-jip-icet2-factsheet.pdf

240 EDA, ‘Remotely Piloted Aircraft Systems’, 19 November 2013, http://www.statewatch.org/observatories_files/drones/eu/eda-2013-rpas-factsheet.pdf

While the most expensive projects are ‘Category B’ projects (financed and controlled by participating Member States), the vast majority of projects related to UAS – and, in particular, related to the technical aspects of their integration into unsegregated airspace – have been initiated by the EDA itself. They have also frequently been financed either from its own operational budget, or from ‘earmarked revenue’. The preparation of the 2008 budget led to the first instance of the Agency invoking Article 15 of Joint Action 2004/551/CFSP, through which requests can be made for money directed at a specific project or set of projects. The EDA asked member states:

[T]o make provisions in their national budgetary plans to fund possible additional projects in the interest of all... the Agency may be confronted with significant and specific projects – which are not always predictable – where work needs to be financed at levels beyond the proper Agency budget. The first concrete case is the UAV initiative.²⁴¹

Obtained through specific requests to Member States, earmarked revenue sits outside the general budget. It was originally planned that for 2008, the Agency would seek €8 million. However, not all Member States could agree on its necessity – “most conditioned their support on the presentation of a clear business case.”

4.8. In the sea and on the ground

It is not solely aerial drones in which the EDA has taken an interest – projects worth nearly €75 million geared towards the development of unmanned maritime systems (UMS,



both surface and underwater) and unmanned ground systems have been undertaken through the Agency. Uninhabited (a synonym for unmanned or remotely-piloted) naval systems were identified as one of 22 research and

technology priorities in the European Defence Research and Technology Strategy of November 2008.²⁴³ A UMS Category A Joint Investment Programme worth €53 million was approved by EU defence ministers in 2009, €47 million of which was public money and €6 million from industry.²⁴⁴ One of its aims is to create “a European system of systems,” with the current intention being to increase interoperability between and the standardisation of national systems and projects. The work may go further than this. The EDA’s 2009 research and technology report notes: “the discussions on interfaces and standardisation may in the long term pave the way for a single European Unmanned Underwater or Surface Vehicle.”²⁴⁵

Work has also begun on a project that seeks to find a “common understanding of minimum safety procedures and a joint view on rules and regulations” related to “safe operations at sea which are applicable to unmanned maritime vehicles.” Belgium, Finland, France, Germany, the Netherlands, Italy and Sweden launched in June 2011 a project through the EDA in an attempt to address the perceived problem. The SARUMS (Safety and Regulations for European Unmanned Maritime Systems) project will also attempt to obtain recognition from the International Maritime Organisation for the “concept of [Unmanned Maritime Systems].”²⁴⁶



SARUMS

The prospect of waterborne drones raises similar issues to those prompted by aerial drones: by whom will they be used, and for what purposes? While there are undoubtedly many potentially useful purposes for such vehicles, there are also legitimate concerns over their use for military purposes, particularly with the potential for autonomous activity. The US Defence Advanced Research Projects Agency (DARPA), for example, is reportedly seeking to develop a waterborne “mothership” that would carry other air- and water-borne drones, easing drone deployment by giving

241 General Secretariat of the Council of the European Union, ‘European Defence Agency: draft Three-Year Financial Framework (2008-2010) and draft 2008 Budget’, 15092/07, 13 November 2007, p.5, http://www.statewatch.org/observatories_files/drones/eu/council-2007-eda-budget-2008.pdf

242 The adoption of the EDA budget seems to have been a frequent source of political friction. The financial three-year financial frameworks have consistently set their sights on a higher budget than that which has later been agreed. In 2007, a budget of €22m was adopted, matching that outlined in the 2007-09 framework. This framework set the 2008 budget at €27m, although this was revised to €32m in the 2008-10 three-year framework, and it was this amount that was subsequently adopted as the annual budget. However, the intended €37m outlined in the 2008-10 financial framework (which, like its predecessor, was never formally adopted) was adjusted to €29.5m. Similarly, the €41m outlined in the 2008-10 framework was subsequently lowered to a more ‘modest’ €30.5m. The French government has apparently pushed in the past for a €200m budget for the Agency (see Frank Slijper, ‘Potentially powerful: the European Defence Agency at five years’, October 2009, <http://www.tni.org/article/potentially-powerful-european-defence-agency-five-years-0>). The attempt to obtain €8 million for drone research for the 2008 budget failed and in the end, it seems that only just over €1.5 million was obtained and spent on a ‘Study on Military Frequency Spectrum Allocation for Unmanned Vehicles/Systems’. Nevertheless, the significant interest of the Agency, and, presumably at least some of the participating Member States, in drone technology is demonstrated by the attempts to obtain revenue beyond that provided for in its annual budget.

243 EDA, ‘Annual Report on R&T Activities’, 2009, p.3, http://www.statewatch.org/observatories_files/drones/eu/eda-2009-r-t-report.pdf

244 ‘Unmanned systems as a first line of maritime defence’, *Defence Matters*, May-July 2012, http://www.eda.europa.eu/docs/eda-magazine/edm_issue1

245 EDA, ‘Annual Report on R&T Activities’, 2009, p.3, http://www.statewatch.org/observatories_files/drones/eu/eda-2009-r-t-report.pdf

246 EDA, ‘Preliminary Programme and call for registrations for Workshop on “Exploring Safe design and operations for the European Unmanned Maritime Systems”’, 12 March 2012, http://www.eda.europa.eu/News/12-03-12/Preliminary_Programme_and_call_for_registrations_for_Workshop_on_Exploring_Safe_design_and_operations_for_the_European_Unmanned_Maritime_Systems%E2%80%9D



the US Navy the ability “to launch drones without the need for large aircraft carriers or land bases”.²⁴⁷

The attention devoted to unmanned ground systems has been more sporadic, with fewer projects given such high levels of funding. In 2007 a three-year project led by *Diehl BGT Defence* that examined “networked multi-robot systems” was awarded €4.7 million. In 2009 a €4 million, joint German-French project hoping to produce a Semi-Autonomous Small Ground Vehicle System Demonstrator was launched. An Italian-led project examining an Unmanned Ground Tactical Vehicle has had two phases: the first in 2009, worth €1.2 million (in partnership with Germany, Greece, Finland, France, Poland and Portugal), and the second in 2011, worth €10 million (with Portugal and Greece). Unmanned ground vehicles are currently largely used by military and civilian forces to undertake surveillance, defuse bombs or rescue injured personnel. *Human Rights Watch* has identified a number of ground-based technologies that can be seen as precursors to fully autonomous drones.²⁴⁸ EU security research funding has backed the development of a “transportable autonomous patrol for land border surveillance” (TALOS, see chapter 3) designed to “track and chase down suspicious people” spotted at the EU’s borders.²⁴⁹

4.9. More to come

The EDA’s most recent Annual Report, covering 2012, notes the EDA’s membership of the European RPAS Steering Group (see chapter 2) and demonstrates clear intent for further work on drones:

*An EDA Joint Investment Programme on UA-SATI (Air Traffic Insertion) was established in June 2012 to invest in selected R&D areas of interest to the defence community while exploiting synergies and ensuring coordination with the European Commission. Additional synergies are being sought with the European Space Agency. The Programme Arrangement will be prepared for a signature by the Ministers of Defence at the November 2013 meeting of the ministerial Steering Board.*²⁵⁰

With pressure from member states’ defence ministers, EU officials and parliamentarians for increased EU involvement in security and defence issues, and with new research projects getting underway, it seems that the EDA will be playing a role in the development of European drone technology for some time to come. Whether it will be subjected to a greater level of scrutiny as it increasingly works to develop “dual-use” technology for both civilian and military purposes remains to be seen.

4.10. Export controls

Although the EU currently lags some way behind its US and Israeli allies in terms of the development and use of drones with offensive capabilities, European manufacturers clearly harbour ambitions to help meet growing global demand. The export of UAVs and other military robotics are currently controlled by the Wassenaar Arrangement and the Missile Technology Control regime. Most EU member states are party to both agreements as well as the EU’s own “Code of Conduct” on arms exports, under which they are *supposed* to respect agreements on non-proliferation and take into account the human rights situation and other factors in the recipient state.

The Wassenaar Arrangement (WA), which currently has 41 member states, is a non-binding agreement that concerns export controls for conventional arms and dual-use goods and technologies. Its aim is to “contribute to regional and international security and stability, by promoting transparency and greater responsibility in transfers of conventional arms and dual-use goods and technologies, thus preventing destabilizing accumulations.”²⁵¹ If a company in a state that is party to the WA seeks to export an item covered by the agreement, it should seek a license or permission in accordance with national rules and regulations.

In respect to unmanned systems, the WA controls refer to UAVs (including “specially designed, modified, or equipped for military use including electronic warfare, suppres-

247 ‘DARPA looking to build underwater drone ‘mothership’, *Russia Today*, 24 July 2013, <http://rt.com/usa/darpa-underwater-drone-mothership-502/>

248 Human Rights Watch & International Human Rights Clinic, ‘Losing Humanity – The Case against Killer Robots’, November 2012, http://www.hrw.org/sites/default/files/reports/arms1112ForUpload_0_0.pdf

249 Nikolaj Nielsen, ‘EU-funded consortium unveils border-control robot’, *EUobserver*, 10 May 2012, <http://euobserver.com/justice/116223>

250 EDA, ‘Annual Report 2012’, p.11, http://www.statewatch.org/observatories_files/drones/eu/eda-2013-annual-report-2012.pdf

251 See <http://www.wassenaar.org/introduction/index.html>.

sion of air defence systems, or reconnaissance missions, as well as systems for the control and receiving of information from the unmanned aerial vehicles”), remotely Piloted Air Vehicles (RPVs), autonomous programmable vehicles, unmanned “lighter-than-air vehicles”, launchers, recovery equipment and ground support equipment. In theory this means that all UAVs, regardless of their size, and UAV technology, require an export license from the exporting State. However, as UAV technology becomes more widely available for commercial uses, it will be harder to control as states inevitably loosen their export policies. Moreover, with major and would-be major UAV producers such as Brazil, India, Iran, Israel, Pakistan and the United Arab Emirates not party to Wassenaar, the prospects of limiting proliferation through export controls are even weaker.

The Missile Technology Control regime (MTCR) is concerned with potential delivery systems for weapons of mass destruction. It is another non-binding agreement to which 34 states are signatories. MTCR “Category I” items are of the greatest sensitivity and should not be exported except in rare cases, including “Complete unmanned aerial vehicles systems (including cruise missiles, target drones and reconnaissance drones) capable of delivering at least a 500 kg ‘payload’ to a ‘range’ of at least 300 km”.²⁵² Military dro-

nes tend to fly at speeds of between 360 km/hr to 640 km/hr. Although there is no international mechanism for ensuring compliance or possibility of sanction by other countries if the MTCR is broken, there is a “strong presumption of denial” underpinning Category I – that is, an assumption that MTCR signatory states will not export such systems.²⁵³ Category II lists items that can be exported after consideration of six criteria to do with the risk of misuse. This includes UAV systems with a range of at least 300 km irrespective of payload.²⁵⁴ Countries have greater discretion about exporting Category Two systems.²⁵⁵

As with the Wassenaar regime, the problem with the MTCR is that if UAV technology becomes more widely available for commercial uses, it will be harder to control, and states will loosen their export policies. Moreover, the industry has already lobbied the MTCR to weaken controls on UAV exports and circumvented existing restrictions by adjusting drones so that they fall under the lighter category II, instead of the more stringent category I.²⁵⁶ Vendors have also argued that they could provide UAV “services” to foreign states without actually selling them drones, arguing that the weapons systems would effectively remain under the control of the state of manufacture.²⁵⁷

252 ‘Missile Technology Control Regime Handbook’, 2010, http://www.mtcr.info/english/MTCR_Annex_Handbook_ENG.pdf; J. Altmann, ‘Arms control for armed uninhabited vehicles: an ethical issue’ in *Ethics, Information and Technology* 15, 2013, pp. 137-152

253 Ibid.

254 Ibid.

255 Chris Cole, ‘Mapping drone proliferation: big business vs. the MTCR’, *Drone Wars UK*, 18 September 2012, <http://dronewars.net/2012/09/18/mapping-drone-proliferation-big-business-vs-the-mtcr/>

256 Chris Cole, ‘Industry lobbying to change drone export control rules’, *Drone Wars UK*, 28 November 2011, <http://dronewars.net/2011/11/28/industry-lobbying-to-change-drone-export-control-rules/>

257 Ibid.

4.11. EDA expenditure on unmanned and autonomous research and development

Project	States/companies involved (where known)	Value (€)
2005		
Digital LOS & BLOS [line-of-sight & beyond line-of-sight] datalinks for LE UAVs	Patria Oy, Instrumentointi Oy (Finland)	715,126
2006		
Sense & Avoid technologies for LE UAVs	SAGEM DS (lead), ONERa, ESPELSA, TNO	750,000
Support to develop a possible set of civil/military requirements for UAVs		4,999
UAV Simulation Testbed (Phase I)		295,000
Balance of Cost and effectiveness study: Satellite, UAV & manned aircraft intelligence collection platform		189,756
2007		
Networked Multi-Robot Systems (NMRS)	Diehl BGT Defence (main contractor) and Fraunhofer FKIE (DE), OTO Melara, Celin Avio, Scuola Superiore Sant'Anna (IT), SENER, Universidad Politécnica de Madrid (ES), Patrimony of the Royal Military School (BE)	4,700,000
UAV Insertion into General Air Traffic		500,000
UAV Simulation testbed (Phase II)	TNO	700,000
Consultancy and Support for Workshop on ARMS (Autonomous Remote Multi-sensing System).		4,999
Huge Network Wireless Connectivity for the Future Autonomous Remote Multisensing System (ARMS)	Thales, Selex Sistem Integrati	396,000
High Bandwidth communications – datalink (a Technology Demonstration Project (TDP) launched by the European Technology Acquisition Programme (ETAP) but for which the contract is awarded by EDA - EDA R&T Report 2011 says value was €7,100,000)	Thales (lead) with SELEX and INDRA (co-leads) and subcontractors Dassault Aviation, EADS Defence and Security, Sagem Défense Sécurité and EADS CASA	7,100,000
20058		
Consultancy study service for Spectrum Allocation for UAVs		4,999
Consultancy Service to provide Expert Support during the WS on “Frequencies Allocation for UAV/UAS” (9-10 Sept 2008)		4,897
Study on Military Frequency Spectrum Allocation for Unmanned Vehicles/Systems (SIGAT)	Nine countries, 23 companies (only Thales is known)	1,556,000
Innovation & Techn. Part. Studies Integrated Multi-function Compact Lightweight Airborne Radars	FR (lead), SE, UK	24,596,000
Assessment of technology needs for Unmanned Combat Air Vehicles	IT (lead), ES, NL, NO, PT	2,339,000
2009		
NEC [Network Enabled Capabilities] Implementation Study		750,000
Air4All Follow-on Study		185,000
Airworthiness & Certification WP 100 ARM		89,500



4.11. EDA expenditure on unmanned and autonomous research and development

Support contract – Strategic Standardisation for UAS		4,990
Reference scenarios for multiple unmanned vehicle operations (SMUVO)	BMT Defence Services	177,238
Semi-Autonomous Small Ground Vehicle System Demonstrator	DE (lead), FR	4,008,000
Battle Damage Tolerance for Lightweight UAV Structures	DE (lead), FR, SE, UK	4,495,000
Unmanned Ground Tactical Vehicle	IT (lead), DE, EL, FI, FR, PL, PT	1,227,000
MidAir Collision Avoidance System (MIDCAS)	SE (lead), DE, ES, FR, IT	60,359,000
2010		
ESA/EDA feasibility study on C2/ATC link for UAS Air Traffic Insertion		400,000
UAS Awareness campaign: creation and production of UAS video		49,900
EU UAS engine: power and propulsion system requirements and architecture analysis		150,000
ISR Capability Package Assessment		600,000
The future of the European military aerospace defence		400,000
Study support to the scoping and prioritisation of topics for the launching of a European Framework Cooperation on Unmanned Aerial Systems		249,400
Energy Supply for Unmanned Underwater Vehicles	ECA	90,000
Maritime Unmanned Surface Vehicles	BMT Defence Services	92,000
Unmanned Maritime Systems	FR (lead), BE, FI, DE, IT, NO, NL, PL, PT, ES, SE	47,000,000
2011		
Unmanned Ground Tactical Vehicle phase 2	IT (lead), PT, EL	10,000,000
Networked Multi-Robot Systems phase 2	DE (lead), ES, BE	4,900,000
Autonomous decision-making based coordination techniques for Autonomous Vehicles	IT (lead), FR, NL	5,000,000
Low observable structures manufacturing	FR (lead), IT, SE	6,000,000
Chemical and Biological Single Molecule Detection Roaming Robot	PT (lead), DE, IT	1,500,000
TOTAL		191,583,804

The information in this table has been taken from EDA annual reports, R&T reports, financial reports, fact sheets and other official documentation.

“Whoever has the capability to control space will likewise possess the capability to exert control of the surface of earth.”

Thomas D. White, U.S. Air Force chief of staff, 1957

5. Above and beyond: the European Space Agency and drones

5.1. Summary

The European Space Agency (ESA) aims “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.” It is an intergovernmental organisation with 20 member states, 18 of which are EU member states. The EU is one of five “other countries” that have cooperation agreements with ESA.

Despite a commitment to the “exclusively peaceful” use of space, over the last decade the work of the ESA has become increasingly geared towards military and security technology. To this end it has cooperated more and more closely with the European Commission and European Defence Agency (EDA) on the development of satellite and communications infrastructure necessary for drones to fly in civil airspace.

Official cooperation between the ESA and EDA on “technological and system issues in the European space-security domain” began in 2005. The two agencies have focused on communications and navigation systems and the technical and regulatory frameworks necessary for the integration of UAS into civilian airspace.

In February 2010 the ESA and EDA jointly contracted studies on the use of satellites for drone navigation, one aim of which was a “roadmap for civilian, security and military services development”. Maritime surveillance – “to detect for example illegal immigration” – was the focus of one study led by the Spanish company *Indra Espacio*.

The ESA was also “actively involved in setting up preparatory activities for security research” and in 2007 was given a mandate “to propose a programme to develop common security technologies and infrastructures”.

The ESA has played a pivotal role in the EU’s own security and environmental monitoring systems, “Copernicus” and “Galileo”, and significant funding from the EU’s seventh Framework Programme (FP7) funding has gone towards projects aimed at enhancing the use of these satellites: for example, by supplying “information and intelligence data in support of the European External Action Service” and for “the detection and monitoring of seafaring vessels”.

The ESA has also launched projects of its own that seek to demonstrate the use of satellites for the use of drones in civil airspace. This includes the command and control of drones by satellite as well as data transfer.

The European Data Relay System (EDRS), worth some €275 million, is concerned with the use of low-orbit satellites for “future unmanned systems”.

The ESA’s UASatCOM project is examining how “small UAS supported by satellites” can be used to undertake mineral, gas and oil exploration surveys for the benefit of “the large oil, gas and mineral exploration and production companies”.

The ESA is also studying the use of drones for agriculture, the clearance of landmines and maritime surveillance.

5.2. Space for peace?

The European Space Agency is an intergovernmental organisation with 20 member states, 18 of which are EU member states.²⁵⁸ The EU is one of five “other countries” [sic] that “have signed cooperation agreements with ESA.”²⁵⁹ Each of these states appoints to the ESA Council an official from its ministry responsible for space activities and each member state representative has one vote in decision-making matters. In 2010, the agency had a total income of just over €3.7 billion, one fifth of which was provided by the EU.²⁶⁰ The agency’s “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.”²⁶¹

The ESA’s interest in drones has developed out of its involvement with two EU policy areas, space and military, which in turn has led to an increasing level of involvement in EU security policy. The EU’s space policy has evolved significantly since the turn of the century, and has increasingly come to incorporate military and security elements. For this the technical and scientific expertise of the ESA is seen by the EU as crucial. The ESA has therefore developed increasingly close relations with the EU and in particular the EDA on the use of navigation satellites, a necessary component for the insertion of drones into civilian airspace so that they can be flown beyond the line of sight of the operator.

The ESA has not simply got involved at the request of EU institutions; the agency itself has pursued an increasingly militaristic R&D agenda. In March 2004 the organisation produced a ‘Position Paper on ESA and the Defence Sector’, which argued for a reinterpretation of the requirement in

the ESA’s convention that the agency should:

*Provide for and... promote, for exclusively peaceful purposes, cooperation among European States in space research applications, with a view to their being used for scientific purposes and for operational space applications systems (Article II).*²⁶²

Rather than take “peaceful” to mean non-military, it was argued, the agency should instead interpret this term as being “non-aggressive”, which would allow the ESA to get involved with security and defence policy and procurement issues. The use of the phrase “peaceful purposes” reflects the wording used in international space law. Article IV of the UN ‘Treaty on Principles Governing the Activities of States in the Exploration and Use of Outer Space, including the Moon and Other Celestial Bodies’ states explicitly the “common interest of all mankind in the progress of exploration and use of outer space for peaceful purposes.”²⁶³

In adopting the idea that “peaceful” means “non-aggressive” rather than “non-military”, the ESA is not breaking any particularly new ground. Rather, it is aligning itself with the dominant perception of space law. While the UN General Assembly near-annually approves resolutions reaffirming the principles of the Treaty on Outer Space,²⁶⁵ these are seen not as preventing the militarisation of space, but rather the ‘weaponisation’ of space. It is agreed by almost all UN member states (with the exception of Israel and the US, who tend to abstain from the resolutions) that although weapons should not be placed in outer space, the use of space-based assets for military purposes is considered to be in line with the law. Most states therefore accept the notion that “peaceful” can include:

*[M]ilitary uses, even those which are not at all peaceful – such as using satellites to direct bombing raids or to orchestrate a “prompt global strike” capability, which is the ability to control any situation or defeat any adversary across the range of military operations.*²⁶⁵

Developments in military technology are thus likely to lead to the ever-increasing militarisation of space, with industry predictions of “a significant increase in tactical and satellite communication technologies on the battlefield.”²⁶⁶

258 Austria, Belgium, Czech Republic, Denmark, Finland, France, Germany, Greece, Ireland, Italy, Luxembourg, the Netherlands, Norway, Poland, Portugal, Spain, Sweden, Switzerland and the United Kingdom.

259 Hungary Estonia and Slovenia are “European Cooperating States”; Canada also has a cooperation agreement. See European Space Agency, ‘What is ESA?’, http://www.esa.int/About_Us/Welcome_to_ESA/What_is_ESA

260 ESA PowerPoint Presentation, ‘An evolving commitment – ESA and the domain of security and defence’, 16 February 2011, p.8

261 ESA, ‘Welcome to ESA’, http://www.esa.int/About_Us/Welcome_to_ESA

262 Convention for the establishment of a European Space Agency, Article II, ‘Purpose’, p.10, http://www.statewatch.org/observatories_files/drones/eu-esa-2008-convention.pdf

263 The phrase reappears elsewhere. A joint ESA-EU Space Council resolution on the European Space Policy emphasises that “All of Europe’s space activities contribute to the goals and fully respect the principles set out by the United Nations’ “Outer Space Treaty”, in particular... the use of outer space for exclusively peaceful purposes.” Resolution on the European Space Policy, http://www.statewatch.org/observatories_files/drones/eu/council-2007-esp-resolution.pdf

264 UN Office for Outer Space Affairs, ‘Index of Online General Assembly Resolutions Relating to Outer Space’, <http://www.oosa.unvienna.org/oosa/en/SpaceLaw/gares/index.html>

265 Reaching Critical Will, ‘Outer Space – Militarisation, weaponisation, and the prevention of an arms race’, undated, <http://www.reachingcriticalwill.org/legal/paros/parosindex.html>

266 Andrew Elwell, ‘ViaSat UK CEO: Demand for ISTAR to grow “exponentially”’, *Defence IQ*, 4 April 2012, <http://www.defenceiq.com/defence-technology/articles/viasat-ceo-istar-via-satellite-comms-growth-is-exp/>

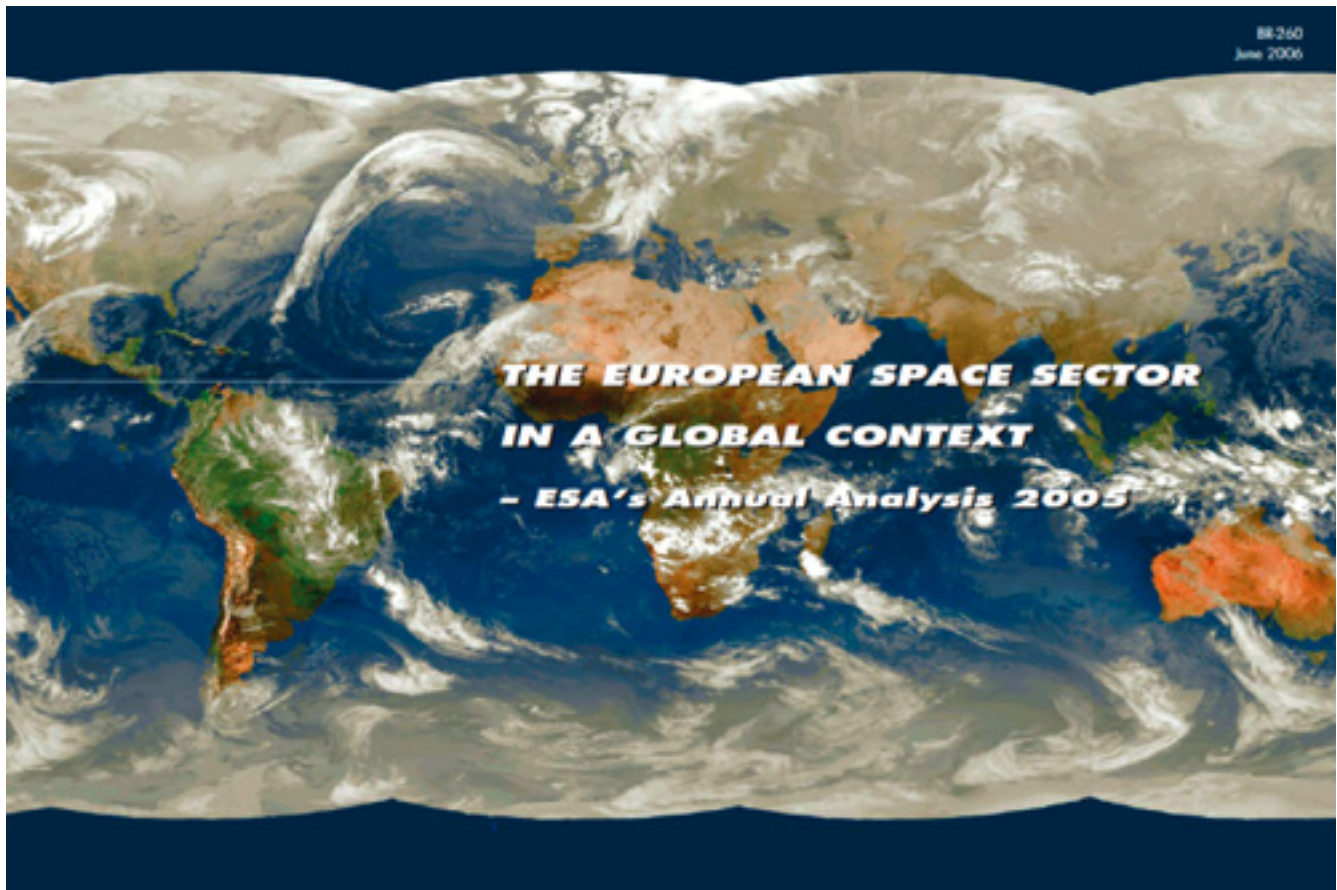
5.3. The European Space Policy: satellites for security

In 2003 the European Community and the ESA signed an agreement on cooperation in “the coherent and progressive development of an overall European Space Policy.”²⁶⁷ In April 2005, the first official meeting took place between the EDA’s Chief Executive and the Director General of the ESA. The following year the ESA reported that:

*Meetings between ESA and EDA executives are now taking place regularly at an operational level. The aim is to exchange information on upcoming technological and system issues in the European space-security domain... the Agency has also been actively involved in setting up preparatory activities for security research on the EU side. It is committed to greater cooperation with the European Commission and the European Defence Agency to place its space and ground-segment expertise and know-how at the service of security-related EU policies.*²⁶⁸

In 2007 the European Space Policy (ESP) – “the culmination of a decade-long process”²⁶⁹ – mandated the ESA to “propose a programme to develop common security technologies and infrastructures.” A subsequent Council Resolution issued in September 2008 (“Taking forward the European Space Policy”) outlined four new priority areas for the ESP: space and climate change; the contribution of space to the Lisbon Strategy (which deals with economic growth in the EU); space and security; and space exploration. It also welcomed the setting up of the structured dialogue among European institutional actors with the aim of achieving a substantial increase in the coordination of space, security and defence related activities, including the European Commission, the General Secretariat of the Council, the EDA, the ESA and member states.²⁷⁰ This spurred the signing by the EU and the ESA of an Agreement dealing with “the security and exchange of classified information” that referenced the development of cooperation on security policy.²⁷¹

Image: ESA



267 Article 3 outlines a number of “specific fields of cooperation: science; technology; earth observation; navigation; communication by satellite; human space flight and micro-gravity; launchers; spectrum policy related to space.” Framework Agreement between the European Community and the European Space Agency, 7 October 2003, 12858/03, http://www.statewatch.org/observatories_files/drones/eu/council-2003-decision-ec-esa-agreement.pdf; Article 3(2) permits the two parties to “identify and develop new fields for cooperation.”; ‘Report by the Head of the European Defence Agency to the Council’, 8967/05, 17 May 2005, p.4, http://www.statewatch.org/observatories_files/drones/eu/eda-2005-report-head-to-council.pdf

268 ESA, “The European Space Sector in a Global Context – ESA’s Annual Analysis 2005”, p.30-31, http://www.statewatch.org/observatories_files/drones/eu/esa-2005-annual-analysis.pdf

269 DG Enterprise and Industry, ‘Space – ESP background’, http://ec.europa.eu/enterprise/policies/space/esp/background/index_en.htm

270 Council Resolution, “Taking forward the European Space Policy”, 29 September 2008, 13569/08, p.13, http://www.statewatch.org/observatories_files/drones/eu/council-2008-esp-resolution.pdf

271 ‘Agreement between the European Space Agency and the European Union on the security and exchange of classified information’, *Official Journal of the European Union*, 14 August 2008, OJ L 219/59, http://www.statewatch.org/observatories_files/drones/eu/esa-2008-eu-esa-agreement-security.pdf



The ESA has also played a pivotal role in the EU's Copernicus (formerly known as GMES, Global Monitoring for Environment and Security) and Galileo satellite programmes, in partnership with the European Commission and the European Environment Agency. For Copernicus, the ESA manages the collection and transmission of data from over 30 satellites, and the agency is preparing to launch its own satellites, lessening its reliance on those operated by member states.²⁷² Whilst concerned to a significant extent with environmental monitoring and navigation systems, Copernicus also has security elements.

The potential for security policy of satellites either operated or used by the ESA has led to the EU providing millions of euros in funding for a variety of projects, through its 7th Framework Programme (FP7, see Chapter 3).²⁷³ The **G-NEXT** project (GMES pre-operational security services for supporting external actions), which has received €4 million via FP7 and will “contribute to the transition of the Copernicus services for Security applications from pre-operational to operational mode,” focuses on supplying “information and intelligence data in support of the European External Action Service (EEAS), including mapping and geo-information products ready for deployment in emergency and crisis situations.” **G-SEXTANT** (Service Provision of Geospatial Intelligence in EU External Actions Support) has similar aims and also received €4 million through FP7. The **BRIDGES** project (Building Relati-



onships and Interactions to Develop GMES for European Security), awarded €1 million through FP7, aims at developing “several potential models of governance for the Copernicus services for Security applications, which address three areas: support to EU External Action, Border Control and Maritime Surveillance.”²⁷⁴



DOLPHIN (Development of Pre-operational Services for Highly Innovative Maritime Surveillance Capabilities) has received nearly €4 million in FP7 funding and intends to “develop new methods and algorithms for processing satellite radar and optical images in order to improve the detection and monitoring of seafaring vessels.”²⁷⁵ **SIMTISYS** (Simulator for Moving Target Indicator SYStem) follows on from a previous FP7 project, **NEWA** (New European Watcher)²⁷⁶ and has received €1.6 million in FP7 funding.

²⁷² European Space Agency, ‘Copernicus’, http://www.esa.int/Our_Activities/Observing_the_Earth/GMES/Overview3

²⁷³ Unless alternative references are provided, all of the EU-funded R&D projects referred to in this chapter can be found by searching the EU’s CORDIS database: <http://cordis.europa.eu/search/index.cfm?fuseaction=proj.advSearch>

²⁷⁴ <http://www.gmes-bridges.eu/>

²⁷⁵ <http://www.gmes-dolphin.eu/project-overview/19>

²⁷⁶ CORDIS, ‘Periodic Report Summary –NEWA (New European Watcher)’, 1 August 2013, http://cordis.europa.eu/search/index.cfm?fuseaction=result.document&RS_LANG=EN&RS_RCN=13573488&pid=0&q=D23540E675F387CC94803DA09EBF3C19&type=sim

It “will provide a useful and powerful tool, which helps the users, such as civil protection and coast guard authorities, with the detection and tracking of small vessels in defined scenarios,” claiming uses for “a range of policy purposes, from border surveillance, to maritime traffic monitoring, environmental protection and fishery control.”²⁷⁷

Previous EU funding programmes have backed similar research: FP5 saw €1.5 million go towards **IMPAST** (Improving fisheries monitoring through integrating passive and active satellite-based technologies) and €600,000 to **DECLIMS** (Detection, classification and identification of marine traffic from space). **LIMES** (Land and Sea Integrated Monitoring for Environment and Security) was funded through FP6 as part of the Copernicus project and was aimed at developing “prototype information services to support security management” in the fields of humanitarian aid and reconstruction, EU border surveillance, surveillance and protection of maritime transport for sensitive cargo, and protection against “emerging security threats” – terrorism, illegal trafficking and proliferation of weapons of mass destruction. There are also a number of Copernicus projects funded through FP7 that are geared towards supporting the development of the EUROSUR border surveillance system (see Chapter 6).

While these projects are being undertaken by a mixture of research institutes, defence contractors and EU institutions (in particular the EU Satellite Centre), the ESA also has projects of its own aimed at directly supporting EU policies. The agency has been in charge of setting up the European Data Relay System (EDRS), “an independent, European satellite system designed to reduce time delays in the transmission of large quantities of data.”²⁷⁸ Following the signing of a €275 million contract in October 2011, the aerospace firm *Astrium* (a wholly-owned subsidiary of the defence giant *EADS*) has taken on responsibility for launching two telecoms satellites into geostationary orbit in order to “enable broadband, bi-directional data relay between Low Earth Orbit (LEO) satellites and an associated ground segment via either of the EDRS payloads.”²⁷⁹

Magali Vaissiere, ESA Director of Telecommunications and Integrated Applications, stated that “EDRS is a big step forward in how low-orbit satellites and future unmanned aerial vehicles can be used, to the benefit of Europe’s citizens and economy.”²⁸⁰ The system is not just seen as a boon for internal security, environmental observation, and maritime surveillance. A November 2010 paper entitled ‘Civil-military synergies in the field of earth observation’, produced

by the a ‘Joint Task Force’ made up of the EU, EDA, the General Secretariat of the Council and the ESA recommended that “European military users should consider using the future European Data Relay Satellite system (EDRS).”²⁸¹

5.4. Beyond the line of sight: deepening cooperation with the European Defence Agency

While the ESA has worked with the European Commission on a number of projects and programmes related to the military and security uses of space, it was not until it stepped up its cooperation with the European Defence Agency that it became significantly involved with the EU’s drone policy. One of the major obstacles for allowing drone use in civilian airspace is the need for beyond-line-of-sight data transmission. The EDA therefore developed an interest in the potential use of satellites for drone navigation and data relay.

Both the EDA and ESA were part of the ‘structured dialogue’ on space that began in 2008, and also included the European Commission and other parties (see above). The EDA and ESA directors also held regular meetings, as noted. It was not until 2009, however, that the relationship between the two agencies really began to bear fruit, when the programme of European Framework Cooperation was announced (see Chapter 4). In March of that year, a workshop was also co-organised by the EDA and ESA “on the use of satellites for the integration of unmanned aerial systems in European airspace.” At the workshop, a plan for coordinated ESA and EDA feasibility studies was announced. While the studies were to be offered separately by each agency, the results would be “jointly usable.”²⁸²

The EDA and ESA used the setting of a February 2010 conference, ‘Bridging efforts: connecting civilian security and military capability development’ to make a show of simultaneously signing the contracts for the feasibility studies.²⁸³ Alexander Weis, the EDA’s chief executive, signed one contract with the multinational *EADS Defence & Security* and its subsidiary *Astrium*; Magali Vaissiere (ESA’s Director of Telecommunications and Integration Applications) signed at the same time a contract with the Spanish firm *Indra Espacio*.

277 SIMTISYS, ‘Project Informations’, http://88.32.124.85/SIMTISYS/?page_id=20

278 ESA, ‘EDRS: an independent data-relay system for Europe becomes reality’, 4 October 2011, http://www.esa.int/esaCP/SEMQD49U7TG_index_0.html

279 Astrium, ‘Astrium builds data highway in space – EDRS’, 4 October 2011, http://www.eads.com/eads/int/en/news/press.20111004_astrium_edrs.html

280 ‘EDRS: an independent data-relay system for Europe becomes reality’, http://www.esa.int/esaCP/SEMQD49U7TG_index_0.html

281 EU, EDA, CSG, ESA Joint Task Force, ‘Civil-military synergies in the field of earth observation’, 26 November 2010, p.3, http://www.statewatch.org/observatories_files/drones/eu/eu-2010-joint-task-force-earth-observation.pdf

282 ESA, ‘Upcoming feasibility studies’, p.4, http://www.statewatch.org/observatories_files/drones/eu/esa-2009-upcoming-studies.pdf

283 EDA, ‘Signature of first coordinated EDA/ESA studies on “satellite services for UAS missions”’, 9th February 2010, http://www.statewatch.org/observatories_files/drones/eu/eda-2010-coordinated-studies-pr.pdf



Alexander Weis and Magali Vaissiere (front centre) at the February 2010 "Bridging efforts" conference.

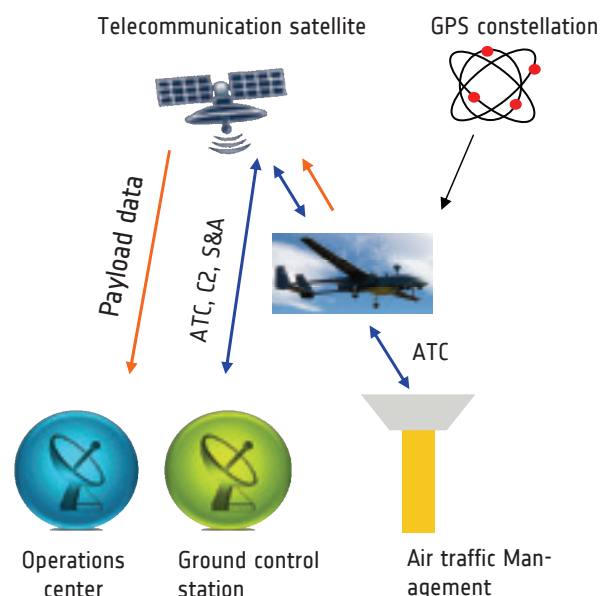
The contracts, which were worth around €400,000 each for six months work, focused on:

- The feasibility and the overall planning for a UAS mission, demonstrating that UAS can be integrated into non-segregated airspace using satellite communications and satellite navigation for Command and Control, Sense and Avoid, and Air Traffic Control, and the added value of satellite communications high data rate payload links;
- The viability of such a solution for future services based on UAS support by space systems;
- The investments necessary in the future and the next steps required in technical and regulatory terms to effectively establish such a service;
- The roadmap for civilian, security and military services development.

In partnership with the German-Dutch firm *AT-One*, Portugal's *GMV*, *Ses ASTRA* from Luxembourg, and *Ineco* from Spain, *Indra Espacio*'s study for the ESA underwent its final review in September 2010. The study (Satellites enabling the Integration in Non-segregated airspace of UAS in Europe, or **SINUE**) focused on "maritime surveillance needs as brought forward by a number of end-users," examining the use of drones equipped "with various sensors and flown over large areas of water to gather surveillance data to detect for example illegal immigration, suspicious shipping or environmental pollution."²⁸⁴

SINUE

Satellites enabling the Integration in Non-segregated airspace of UAS in Europe



284 ESA, "The SINUE project investigates UAS air traffic insertion", 6 October 2011, <http://iap.esa.int/news-and-events/sinue-study-news-04-2011>

SINUE also reinforced the necessity of cooperation between the two agencies, coming to the conclusion that:

Satellites can provide a technically feasible solution for controlling and commanding the unmanned aircraft... for relaying the air traffic control voice communications... and for retrieving high bit-rate payload data in near real time... satellites are an important enabler for inserting UAS into non-segregated air space, when used together with suitable UAS contingency procedures.²⁸⁵

If, as the ESA's Director remarked, the signing of the contracts in 2010 represented "the first milestone on the common EDA-ESA journey", then the 'Administrative Arrangement concerning the establishment of their cooperation', signed in June 2011, marked the second.²⁸⁶ The agreement foresees "a structured relationship and a mutually beneficial cooperation between EDA and ESA through the coordination of their respective activities", with the aim of:

[E]xploring the added value and contribution of space assets to the development of European capabilities in the area of crisis management and CSDP [Common Security and Defence Policy], taking into account the European Space Policy. The cooperation will also seek to improve synergies between space and defence activities.

Coming six years after EDA-ESA cooperation began, the agreement consolidated the existing relationship. It allows the two bodies to identify "capability gaps or shortfalls that could be filled by space assets for the sustainable and effective implementation of relevant EU policies"; to investigate whether "capability requirements can be shared and thus supported by both EDA and ESA"; to coordinate research, technology and demonstration activities; to explore "synergies between existing dedicated EDA and ESA programmes and their future evolution"; and to develop joint "activities in support of industrial competitiveness and European non-dependence [on foreign industry] issues". The arrangement also contains provisions permitting the exchange of classified information.²⁸⁷



285 ESA, 'ARTES 20 Feasibility Study – SINUE, Satellites enabling the Integration in Non-segregated airspace of UAS in Europe', p.2, http://www.statewatch.org/observatories_files/drones/eu/esa-2011-sinue-brochure.pdf

286 General Secretariat of the Council, 'Draft Administrative Arrangement Between the European Defence Agency and the European Space Agency concerning the establishment of their cooperation', 10085/11, 12 May 2011, http://www.statewatch.org/observatories_files/drones/eu/council-2011-eda-esa-coop-agreement.pdf

The EDA-ESA agreement paved the way for the signing in December 2011 of an “arrangement on a demonstration project in the area of UAS command and control via satellite.” Unlike the previous coordinated feasibility studies, this study will involve the physical flight of a drone, rather than the use of virtual simulators. A further sign of the increased cooperation between the EDA and ESA is that it is “the first jointly funded activity,” up to a value of €1.2 million, “since the entry into force of the Administrative Arrangement of the two Agencies in June 2011.”²⁸⁸

The agencies held an “open competition” to try and find a contractor who could “demonstrate to the user community that UAS supported by satellites and flying in non-segregated airspace can fulfil their needs”, and show “the capability of safe insertion of UAS in non-segregated airspace using satellites, identify issues and required procedures, and provide early inputs to regulatory bodies.” It was a specific part of the proposal that the winning contractor use the opportunity to demonstrate the possibilities for maritime surveillance, a field that covers areas as diverse as border security, environmental monitoring, the tracking and monitoring of vessels, search and rescue, oceanography and the enforcement of fisheries policy.²⁸⁹

This project was outlined in more detail to the “user/stakeholder” community at the third joint EDA-ESA workshop on UAS held at the ESA’s centre in Redu, Belgium, in March 2012.²⁹⁰ The 2012 workshop focused on ‘UAS Applications & Operational Scenarios’, with presentations on flood monitoring, “oil, gas and mineral exploration and production activities”, and, from Zdravko Kolev of Frontex, border surveillance. Standards and regulations were also looked at, with representatives of the EDA, EUROCONTROL and EASA looking at the work of the EDA on “air traffic insertion”, “satellite based communication and data links”, and “satellite based components of an integrated system” respectively.²⁹¹



5.5. ESA drone programmes

The European Space Agency has also initiated its own drone programs, in which the Agency is providing multinational corporations with significant amounts of research funding. A prime example of this is **UASatCom**, which explores how “small UAS supported by satellites” can be used to undertake mineral, gas and oil exploration surveys and to monitor oil and gas pipelines. *Barnard Microsystems*, *Inmarsat* and *AnsuR* are the partners in a €180,000 study that began in June 2011, and for which ESA is providing 50% of the funds.²⁹² *Barnard Microsystems* gave a presentation on the issue at the joint EDA-ESA March 2012 workshop mentioned above. The targeted end users for the study are “the large oil, gas and mineral exploration and production (“E&P”) companies such as... *BP*; *Exxon*; *Royal Dutch Shell*; *Statoil*; *Anglo-American*; *BHP Billiton*; *Rio Tinto Zinc*; and *Xstrata*”.²⁹³ Quite why these corporations – some of which rank amongst the largest in the world – cannot pay for their own feasibility studies is unknown.

A somewhat more philanthropic venture is being undertaken via the **SADA** (Space Assets for Demining Assistance) feasibility study, demonstrating the potentially beneficial applications for which drones could be used. SADA is exploring the use of drones for the purpose of mine clearance in former warzones. For this study, RadioLabs, the University of Rome Sapienza, *Meteorological and Environmental Earth Observation* (MEEEO), *Aurensis*, *GTD*, and *Vrije Universiteit Brussel* will be provided with €400,000 by the ESA to examine whether UAVs can make demining programs more efficient and effective, by avoiding “the unnecessary deployment of clearance activities in non-contaminated

287 Making reference to the 2008 EU-ESA agreement on the exchange of classified information, the article contains a provision that the “EDA and ESA agree that a security arrangement between EDA and ESA will lay down the implementing measures for the direct exchange of classified information between them in accordance with their respective applicable security regulations.” Towards the end of the 2012 this was further formalised with the approval of a ‘Draft Security Arrangement between the European Space Agency Security Office (ESASO) and the European Defence Agency Security Office (EDASO) for the protection and safeguarding of classified information exchanged between ESA and EDA’ (23 October 2012, 15335/12, http://www.statewatch.org/observatories_files/drones/eu/council-2012-eda-esa-security-agreement.pdf). The 2011 Arrangement gives permission for the two agencies to exchange personnel who can sit on the decision-making board of the other agency when there arise “agenda points on matters of common interest relating to the implementation of [the] Arrangement”.

288 EDA, ‘Annual Report 2011’, p.9, <http://www.statewatch.org/news/2013/oct/2011-eda-annual-report.pdf>

289 ESA, ‘Open Competition: ESA–EDA demonstration of the use of satellites complementing UAS integrated in non-segregated airspace’, 4 April 2012, <http://iap.esa.int/opportunities/iap/esa-eda-uas-demo-study>

290 ESA, ‘3rd User/Stakeholder Workshop on Unmanned Aircraft Systems (UAS) - Registrations are closed’, 19 March 2012, <http://iap.esa.int/news-and-events/eda-esa-uas-workshop-2012-announcement-02-2012>. The first of these workshops was held in May 2009 in Noordwijk, the Netherlands, see: ESA, ‘Presentations: Space for UAS Workshop’, 29 May 2009, <http://telecom.esa.int/telecom/www/object/index.cfm?fobjectid=29800>

291 EDA & ESA, ‘3rd User/Stakeholder Workshop on Unmanned Aircraft System (UAS)’, 8 March 2012, http://www.statewatch.org/observatories_files/drones/eu/esa-2012-esa-eda-uas-workshop.pdf

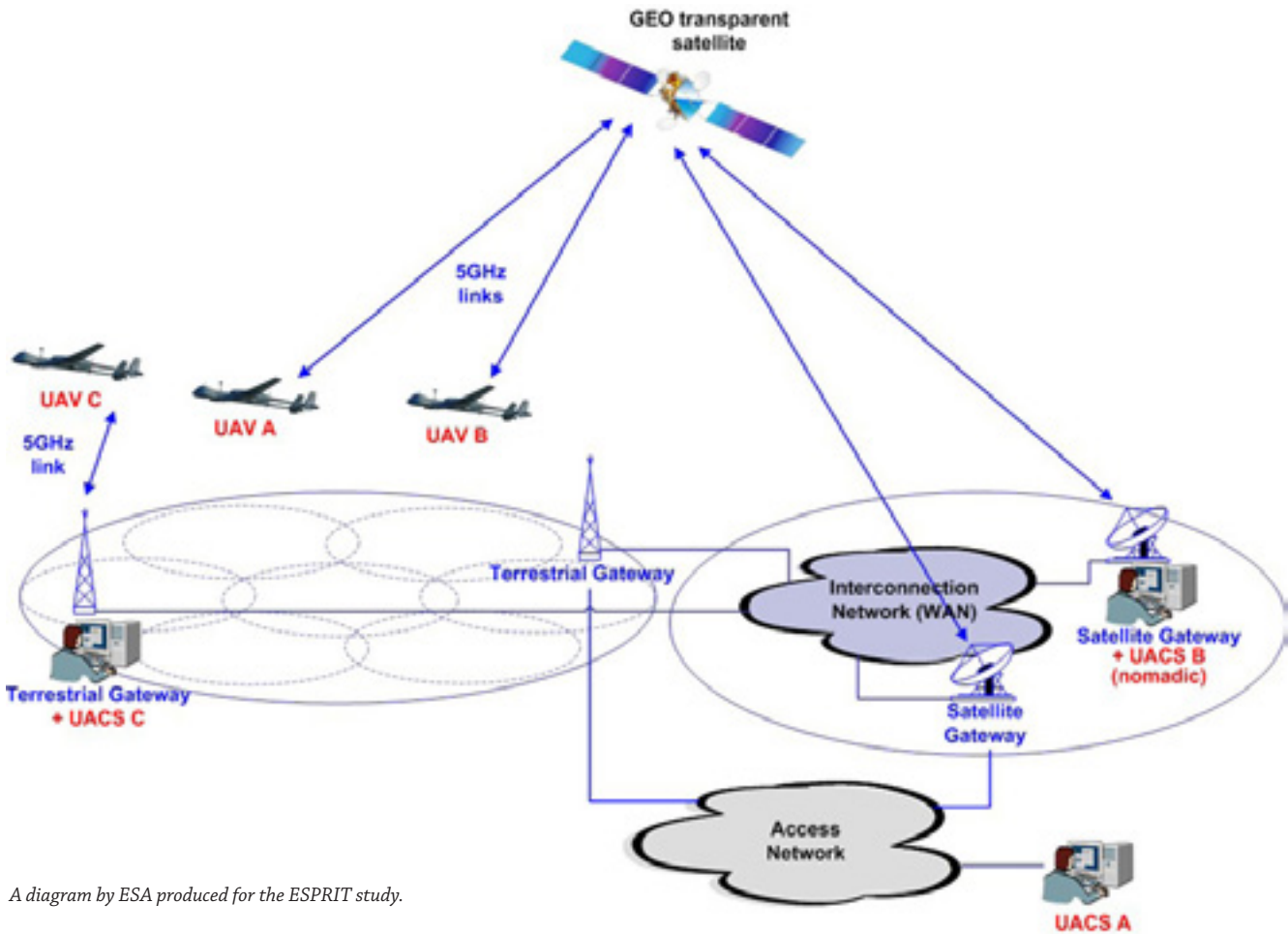
292 R. Rinaldo and L. Duquerroy, ‘ESA (D-TIA) activities on Unmanned Aircraft Systems (UAS)’, presentation given to the EC-EDA 5th Unmanned Aircraft Systems (UAS) EU Workshop – Research and Development for UAS, Royal Military Academy, Brussels, 9th February 2012, <http://www.slideserve.com/idalee/esa-d-tia-activities-on-unmanned-aircraft-systems-uas-r-rinaldo-and-l-duquerroy-integrated-and-telecommunications>

293 ESA, ‘UASatCom – Geophysical and Pipeline Monitoring Services’, 4 October 2012, <http://iap.esa.int/projects/energy/uasatco>

areas,” and reducing “the cost of detection and clearance per unit of land area (by planning, mapping).”

BIOSCOPE is a feasibility study that seeks to ensure “timely information on the status of [farmers’] crops to plan field operations” – in layman’s terms, this presumably means planting, watering, spraying and maintaining crops. UAVs may be used to complement imagery acquired from satellites, depending on the outcome of the €180,000 study. Fifty per cent of the funding is coming from the ESA.

Two further studies hope to refine technical issues that will enable more extensive drone usage. The **ESPRIT** (Emerging system concepts for UAS command and control via satellite) study began in October 2011 and is intended to “define and analyse a satellite system for UAS BLOS [beyond line-of-sight] C2 [command and control],” as over the next two decades, “the civil Unmanned Aerial Systems (UAS) market is expected to ramp-up exponentially.”²⁹⁴ Similar work was amongst the first projects initiated by the EDA after its operations began in 2005. The contractors are *Thales Alenia Space* (itself a joint venture between *Thales* and *Finnmeccanica*), *TRIAGNOSYS*, and *Honeywell*.



A diagram by ESA produced for the ESPRIT study.

The ‘High speed UAV Satcom terminal’ study seeks to develop a “high-speed (512 Mbps) UAV satcom terminal” in order to satisfy the needs of future UAVs. An ESA presentation on the €1,000,000 study, which is part of the wider **ARTES 5.1** telecoms satellites project involving 17 states,²⁹⁵ gives the example of the US military’s ‘Gorgon Stare’ technology, which uses multiple cameras affixed to a drone to capture masses of high-resolution imagery.²⁹⁶ The status of

the project is unknown. As of February 2012 consultation was “ongoing with industry about interest and to refine the scope of the activity”.



294 ESA, ‘ESPRIT’, 22 June 2012, <http://telecom.esa.int/telecom/www/object/index.cfm?fobjectid=31851>

295 Austria, Belgium, Canada, Denmark, Finland, France, Germany, Ireland, Italy, Luxembourg, the Netherlands, Norway, Portugal, Spain, Sweden and Switzerland and the United Kingdom. ESA, ‘ARTES 5.1 Technology’, 5 September 2012, <http://telecom.esa.int/telecom/www/object/index.cfm?fobjectid=186>

296 Even more advanced technology to that used by Gorgon Stare was revealed in a US television programme “detailing the capabilities of a powerful aerial surveillance system known as ARGUS-IS, which is basically a super-high, 1.8 gigapixel resolution camera that can be mounted on a drone... the system is capable of high-resolution monitoring and recording of an entire city.” See: Jay Stanley, ‘Drone ‘Nightmare Scenario’ Now Has A Name: ARGUS’, *American Civil Liberties Union*, 21 February 2013, <http://www.aclu.org/blog/technology-and-liberty-free-speech-national-security/drone-nightmare-scenario-now-has-physical>



Another project, **DeSIRE** (Demonstration of Satellites enabling the Insertion of RPAS in Europe) aims to demonstrate the safe use of drones for maritime surveillance. Its target audience is “governmental and international organisations responsible for service operations, such as civil security bodies, national coast guards, border control authorities etc.” The organisations involved include, amongst others:

- Spain’s *Guardia Civil*;
- The Spanish National Institute of Aerospace Technology;
- European Aviation Safety Agency;
- EUROCONTROL;
- EUROCAE WG-73: Working Group on UAV Systems;
- The Royal Netherlands Air Force.

The Spanish firm *Indra* is leading the study in collaboration with *Israel Aerospace Industries* (IAI), and demonstration flights at the San Javier airport in Murcia will make use of an IAI Heron Medium-Altitude Long Endurance (MALE) drone equipped with “maritime patrol radar” and equipment “for day and night video surveillance.” Alongside *Indra* are Germany’s *AT-One*, Luxembourg’s *SES*, the

French and Italian branches of *Thales Alenia Space*, and Italy’s *CIRA*.

DeSIRE “foresees dissemination actions to provide relevant demonstration results and support the regulatory progress on air traffic insertion,” and “will represent a significant contribution to define and pave the roadmap for the future integration of RPAS into general Air Traffic Control (ATC) with the support of satellite technologies.”²⁹⁷ Information captured during demonstration flights “will be transmitted in real time to the ground and integrated in the SIVE system.” SIVE (*Sistema Integrado de Vigilancia Exterior*, Integrated System for External Surveillance) is “the maritime borders surveillance system operated by the Spanish *Guardia Civil*” which monitors the Strait of Gibraltar using radar and surveillance cameras (see chapter 3). The European Commission noted in a 2008 Communication that information transmitted to SIVE would eventually be integrated into the EUROSUR border surveillance system.²⁹⁸

In April 2013 the project partners launched “a series of test flights to demonstrate the role of satellite communications for integrating in civil and military airspace RPAS Beyond Line of Sight (BLOS),” at the San Javier Air Base in Murcia. One flight provided “a generic terrestrial and maritime surveillance service, demonstrating the dual use of RPAS”. The EDA has claimed that the “agreed set of requirements”

²⁹⁷ ESA, ‘DeSIRE – Demonstration of Satellites enabling the Insertion of RPAS in Europe’, 15 October 2013, <http://iap.esa.int/projects/security/DeSIRE>
Satellites alone can also be used for enhancing border control – the ESA funded a study led that concluded in January 2012 that investigated the possibility for the Greek police to use satellites to improve border control, presumably primarily at the Greek-Turkish border. The study “focuses on the determination of the feasibility of using satellite based earth observation, navigation and communications services to provide a cost effective operational solution to support the surveillance of land borders. The study specifically targets the land border control situation in areas outside regular border checkpoints.” See: ESA, ‘Land Border Control’, 12 January 2012, <http://iap.esa.int/projects/security/land-border-control>

²⁹⁸ European Commission, ‘Communication from the Commission examining the creation of a European Border Surveillance System (EUROSUR)’, COM(2008) 68 final, 13 February 2008, <http://www.statewatch.org/news/2008/feb/eu-com-68-08-eurosur.pdf>; for more information on SIVE see Francisco Acosta, ‘Maritime surveillance, operational concept’, 29 March 2012, http://www.statewatch.org/observatories_files/drones/eu/persues-2012-maritime-surveillance-paper.pdf

that result from the project “could serve as the basis for the future definition of the regulatory framework for RPAS Air Traffic Integration in Europe”.²⁹⁹

5.6. Making space for drones

The work of the European Space Agency has, over the last decade, fallen ever-more neatly into step with that of the European Commission and, in particular, the European Defence Agency. The insertion of drones into civilian airspace would be impossible without the highly-specialised knowledge and skills of the ESA, but its degree of involvement in the EU’s drone programmes is not matched by any degree of democratic oversight or scrutiny. A report in *Space News* from November 2012 suggests that the EU itself has an issue with “ESA’s inclusion of non-EU nations in its membership, the way it awards contracts and the lack of democratic oversight of ESA’s functioning.”³⁰⁰

Conclusions issued in February 2013 by the Council of the European Union appear to reinforce this view, saying that “there may be a need to review and enhance the functioning of the relationship between the EU and ESA in view of the changes in the political context, the increasing role of the EU in the space domain, competitiveness challenges faced by the space sector and the growing importance of space activities for society.”³⁰¹ While “some results” of these discussions were expected by 2014, “the outcome cannot be taken for granted”.³⁰²

Whatever the outcome of this wrangling between the EU and ESA, it seems like that the ESA will continue to increasingly align its development of drone facilitation technology with the work of both the Commission and the EDA. *Space News* suggests that the Commission “has viewed ESA as a shop of space mechanics, overseeing the technical aspects of space program management but leaving policy decisions to the EU.” The fact that regular meetings between the heads of the EDA and ESA have taken place at “operational level” would suggest that this is not quite the case.³⁰³ The upshot is that unaccountable officials have spearheaded technocratic projects and programmes that have the potential to profoundly affect society, with no opportunities for ordinary members of society to express their views on the issues.

299 EDA, ‘Successful ESA-EDA Flight Demonstration on RPAS Insertion into Civil Airspace’, 26 April 2013, <http://eda.europa.eu/info-hub/news/2013/04/26/successful-esa-eda-flight-demonstration-on-rpas-insertion-into-civil-airspace>

300 Peter B. de Sekling, ‘Battle brewing between ESA and EU over space policy, budget authority’, *Space News*, 30 November 2012, <http://www.spacenews.com/article/battle-brewing-between-esa-and-eu-over-space-policy-budget-authority>

301 Council of the European Union, ‘Establishing appropriate relations between the EU and the European Space Agency (ESA) – Council conclusions’, 6571/13, 19 February 2013, http://www.statewatch.org/observatories_files/drones/eu/council-2013-eu-esa-relations.pdf

302 Lucia Marta, ‘Consolidating the European Space Policy requires an evolution of its governance, which is currently structured around three main types of actor’, *European Politics and Policy*, 21 June 2013, <http://blogs.lse.ac.uk/euoppblog/2013/06/21/european-space-policy-is-governed-by-a-triangle-of-the-eu-the-european-space-agency-and-national-space-agencies/>

303 Peter B. de Sekling, ‘Battle brewing between ESA and EU over space policy, budget authority’, *Space News*, 30 November 2012, <http://www.spacenews.com/article/battle-brewing-between-esa-and-eu-over-space-policy-budget-authority>

Solutions for more effective capabilities are within reach. For example, Unmanned Aerial Vehicles can monitor movement on the ground in deployed military operations or civilian missions abroad. The same UAVs, equipped with the same sensors, can be used to spot illegal immigrants at Europe's external borders.

Catherine Ashton, transcript of keynote speech at the European Defence Agency conference 'Bridging efforts, Connection Civilian Security and Military Capability Development', 9 February 2010.³⁰⁴

6. Patrolling the borders: Frontex and drones

6.1. Summary

Frontex is the EU's borders agency and was established in 2004. Over the years its powers and budget have increased significantly and it has become a significant player in EU border control policy and operations and the development of the EU security apparatus more generally.

EU border policy is increasingly geared towards the use of high technology for the purposes of surveillance, particularly through the EUROSUR project.

Frontex's interest in drones and other forms of aerial surveillance stems from this high-tech vision of border control. It routinely participates in the Commission's workshops and conferences on drones, cooperates with the EDA and is frequently involved in FP7-funded security research projects.

Cooperation between Frontex and the EDA is shrouded in secrecy but it appears to have focused on the "civil-military synergies" in "border management", particularly maritime surveillance and most recently the EU Border Assistance Mission (EUBAM) in Libya.

Frontex has also organised a series of demonstration events and workshops at which large defence and security companies have been invited to demonstrate the benefits of drones, aerostats (blimps) and optionally-piloted aircraft for border surveillance. In some cases, Frontex has paid these companies to demonstrate their wares.

EU officials have repeatedly pushed for the swifter and more widespread introduction of border surveillance technologies, particularly as part of EUROSUR – for example in the wake of the drowning of hundreds of people off the coast of Lampedusa in early October 2013 – yet there is no obligation under the EUROSUR rules for member states to assist vessels in distress at sea.

Frontex's 'Border Surveillance Development Programme' was given €580,000 for 2013, a €230,000 increase on its 2012 budget. One strand of this work will see the agency investigate the use of wide area surveillance systems, which allow the capture of high-resolution imagery of areas miles wide.

Frontex is also interested in optionally-piloted aircraft, rather than completely unmanned drones, apparently as a way around the current restrictions on flights in civilian airspace of unmanned vehicles.

304 <http://www.eda.europa.eu/WebUtils/downloadfile.aspx?fileid=909>

6.2. The EU border police agency



Frontex, formally known as the European Agency for the Management of Operational Cooperation at the External Borders of the Member States of the European Union (Frontex is a conjunction of the French *frontières extérieures*), was established in 2004 by Council Regulation (EC) 2007/2004, and officially began work on 1 May 2005.³⁰⁵ Two further amendments to the Regulation (the first in 2007, the second in 2011) significantly expanded the powers of the Agency, permitting – amongst other things – the initiation of joint operations at the border(s) of a Member State(s); the coordination and organisation of joint return (deportation) flights; and giving members of *European Border Guard teams* the right to carry weapons (with no reference to the use of force being “necessary” or “proportionate”). It has been heavily criticised for a variety of reasons: its role in “push-back” operations in which migrants crossing the Mediterranean have been returned to their ports of origin;³⁰⁶ the assistance it has provided to Greece in capturing and detaining migrants, whose subsequent treatment has been condemned by the European Court of Human Rights;³⁰⁷ and more generally its transparency and accountability. It has attempted to soothe some of these concerns with the appointment of a Fundamental Rights Officer and a Consultative Forum made up largely of NGOs, although this group has no binding powers and one of its members has told the European Parliament that the Forum is incapable of addressing the “structural problems of Frontex”.³⁰⁸

Those structural problems stem from what the UN Special Rapporteur on the human rights of migrants, François Crépeau, has called an EU policy context in which “irregular migration remains largely viewed as a security concern that must be stopped.”³⁰⁹ The practical aims of detention and expulsion of irregular migrants are increasingly supposed to be attained through the means of advanced surveillance technologies, as part of the EU’s system of ‘Integrated Border Management’. To further this approach, when the Regulation governing Frontex was amended for the second

time in 2011, the revised Article 7 expanded the powers of the Agency in relation to the ownership and operation of technical equipment. It is now permitted to:

*[A]cquire, itself or in co-ownership with a Member State, or lease technical equipment for external border control to be deployed during joint operations, pilot projects, rapid interventions, joint return operations or technical assistance projects.*³¹⁰

Supporters of Frontex had long argued for the Agency to be given greater powers to own and operate technical equipment. In January 2007 Franco Frattini, who was at the time European Commissioner for Justice, Freedom and Security, reportedly urged EU member states to hand control of patrol boats and helicopters to Frontex so that it could “handle the expected onslaught of even more illegal migrants.”³¹¹



In the years since, the Agency has acquired access to Member States’ equipment such as helicopters, buses, patrol cars, vans, mobile radar units and boats.³¹² It has also hosted a series of events at which it has examined the potential for border surveillance through using aerostats (blimps), unmanned drones, and optionally-piloted aircraft. Optionally-piloted aircraft (OPAs), which can be flown remotely by a ground-based operator but have the option to retain a pilot on board, are seen as particularly useful “because they circumvent EU laws which prohibit fully unmanned drones from flying in commercial airspace.”³¹³ Whatever the specific technology to be used, the chief goal is the pervasive surveillance from both land and air of the EU’s external borders.

305 Council Regulation (EC) No 2007/2004 of 26 October 2004 establishing a European Agency for the Management of Operational Cooperation at the External Borders of the Member States of the European Union, http://www.statewatch.org/observatories_files/frontex_observatory/FrontexREG.pdf

306 Human Rights Watch, ‘Pushed Back, Pushed Around’, September 2009, http://www.hrw.org/sites/default/files/reports/italy0909web_0.pdf

307 Human Rights Watch, ‘The EU’s Dirty Hands’, September 2011, <http://www.hrw.org/print/reports/2011/09/21/eu-s-dirty-hands>

308 ‘EU policy on irregular migration is “fundamentally at odds with the human rights approach”’, *Statewatch News Online*, 23 May 2013, <http://database.statewatch.org/article.asp?aid=32347>

309 ‘EU policy on irregular migration is “fundamentally at odds with the human rights approach”’, *Statewatch News Online*, 23 May 2013, <http://database.statewatch.org/article.asp?aid=32347>

310 Article 7, Regulation (EC) No 863/2007 of the European Parliament and of the Council of 11 July 2007 establishing a mechanism for the creation of Rapid Border Intervention Teams and amending Council Regulation (EC) No 2007/2004 as regards that mechanism and regulating the tasks and powers of guest officers’, <http://www.statewatch.org/news/2011/nov/eu-oj-Frontex-regulation.pdf>

311 *Police Aviation News*, February 2007, p.2-3, <http://www.policeaviationnews.com/Acrobat/PANewsFeb2007.pdf>

312 Frontex, ‘European Patrols Network and Centralised Record of Available Technical Equipment to be presented at tomorrow’s JHA Council’, <http://www.frontex.europa.eu/news/european-patrols-network-and-centralised-record-of-available-technical-equipment-to-be-presented-at-tomorrow-s-jha-council-01bOgX>; Frontex, ‘Frontex to deploy 175 specialist border-control personnel to Greece’, 29 October 2010, <http://www.statewatch.org/news/2010/oct/eu-frontex-rabits-greece-2.pdf>

313 Nikolaj Nielsen, ‘EU looks to ‘hybrid drones’ for legal shortcut on migration’, *EUobserver*, 14 October 2013, <http://euobserver.com/priv-immigration/121735>

6.3. Friends in high places

Frontex plays a key role in the ongoing development of the EU's security apparatus and is routinely represented in EU discussions on drones. Agency representatives have given presentations at high-level Commission events on the insertion of drones into civil airspace, and it has long been involved in the European Border Surveillance System (EUROSUR) project.³¹⁴ It is also involved in ongoing cooperation with the EDA and is frequently listed as a beneficiary of FP7-funded security research projects. It also acts in an advisory capacity to some of these projects.

For some time a goal of the agency has been the integration of aerial surveillance capabilities into the EU's high-tech vision of an Integrated Border Management system.³¹⁵ At a 2010 conference, 'Bridging Efforts – Connecting Civilian Security and Military Capability Development', the head of the agency's Joint Operations Unit, Rustamas Liubajevs, noted that there are two major challenges for European border security: firstly, the sharing of information and means of communication, and secondly "interoperability - coordination of border security activities and standardisation of related technical equipment (e.g. Unmanned Aerial Systems)".³¹⁶



In 2007, the EDA noted in its Work Programme that work should continue on maritime surveillance, in particular on "the three identified key areas (Networking, Tactical UAVs, Identification of small targets), in conjunction with the EU Agency Frontex".³¹⁷ However, the degree of cooperation

between the EDA and Frontex is not easy to gauge – little has been made public about collaboration between the two agencies, although it is clear that their interests overlap in developing drone technology for civil applications. This lack of transparency is reflected more widely in Frontex's work (see below). It seems that the EDA at the very least keeps Frontex 'in the loop' with regard to research and development that demonstrate opportunities for "civil-military synergies".

For example, for its C-MANPADS (Counter-Man Portable Air Defence Systems, "protective solutions for air assets in order to enhance their availability and increase freedom of manoeuvre")³¹⁸ project, the EDA invited Frontex (along with others such as the Commission Directorate-General for Home Affairs, the Directorate-General for Transport and the European External Action Service) to a series of workshops that sought to identify "civil military synergies in the context of EU engagement (either civil missions or military operations)".³¹⁹ These "synergies" have developed apace in recent years and a recently-launched EU Border Assistance Mission (EUBAM) in Libya aimed at "improving and developing the security of the country's borders" is "the first CSDP mission fully devoted to border management". Frontex has been "closely associated with the planning of the mission and will complement mission activities".³²⁰

Meanwhile the EDA-led Maritime Surveillance (MARSUR) project:

[A]ims at developing an EU network of military legacy Maritime Surveillance System [sic], in support of CSDP operations... the architecture retained shall guarantee a smooth connexion of other future stakeholders to the Network, be it EU Agencies (Frontex, EMSA [European Maritime Safety Agency], etc.) or any other third parties.

The Network is apparently "eagerly awaited" by 15 Member States participating in a working group, according to a contract notice issued in 2011.³²¹ Ultimately it is intended to play a part, along with EUROSUR and other systems,

314 EUROSUR has been examined in detail in the report 'Borderline', published in June 2012 by the *Heinrich Böll Stiftung*: <http://www.statewatch.org/news/2012/jun/borderline.pdf>

315 A definition of Integrated Border Management (IBM) is provided by the Commission: "combining control mechanisms and tools, based on the flows of persons into the EU.

It involves taking measures at the consulates of the Member States in Non-EU Member Countries, measures in cooperation with neighbouring Non-EU Member Countries, measures at the border itself, and measures within the Schengen area." See: European Commission, 'Next steps in border management in the EU', undated, http://europa.eu/legislation_summaries/justice_freedom_security/free_movement_of_persons_asylum_immigration/114580_en.htm; Another definition of the "principle" of IBM (again from the Commission), is: "National and international coordination and cooperation among all the relevant authorities and agencies involved in border security and trade facilitation to establish effective, efficient and integrated border management systems, in order to reach the objective of open, but well controlled and secure borders." See: European Commission, 'Guidelines for Integrated Border Management in the Western Balkans', January 2007, http://www.statewatch.org/observatories_files/drones/eu/com-2007-ibm-guidelines-wb.pdf

316 Rustamas Liubajevs, 'Planning Capabilities for European Border Security – Towards a Structured Approach' in *EDA Special Bulletin: Bridging Efforts*, 9 February 2010, p.17, http://www.statewatch.org/observatories_files/drones/eu/eda-2010-bridging-efforts-bulletin.pdf

317 EDA, 'Work Programme 2007', http://www.statewatch.org/observatories_files/drones/eu/eda-2007-work-programme.pdf 'B-Brussels: comprehensive workshops on future C-Manpads solutions', 24 May 2012, http://www.statewatch.org/observatories_files/drones/eu/eda-2012-manpads-contract.pdf

318 EDA, 'Workshops on Future C-MANPADS Solutions', <http://www.eda.europa.eu/info-hub/events/2012/10/26/workshops-on-future-c-manpads-solutions>

319 'B-Brussels: comprehensive workshops on future C-Manpads solutions', 24 May 2012, http://www.statewatch.org/observatories_files/drones/eu/eda-2012-manpads-contract.pdf

320 Catherine Ashton, 'Final Report by the High Representative/Head of the EDA on the Common Security and Defence Policy', 15 October 2013, p.9, <http://www.statewatch.org/news/2013/oct/eu-eas-military-plan.pdf>; European External Action Service, 'EU Border Assistance Mission (EUBAM) in Libya', undated, http://www.statewatch.org/observatories_files/drones/eu/eas-2012-eubam-libya-factsheet.pdf

321 EDA, 'Specifications attached to the Invitation to Tender 11.CAR.OP.133 "Practical Technical Guidelines for Developing Network Interoperability"', undated, http://www.statewatch.org/observatories_files/drones/eu/eda-2011-tender-network-interop.pdf

in a “Common Information Sharing Environment” which will see the pooling of information from border control, fisheries, military, sea and coast guard, environmental, customs and law enforcement authorities’ systems in order to generate “a ‘situational awareness’ of activities at sea across all relevant sectors to facilitate sound decision making”³²²

Representatives from Frontex (alongside other EU agencies and institutions) have also “regularly” been represented in coordinating meetings for an EDA project that seeks to develop intelligence, surveillance and reconnaissance (ISR) capabilities that would allow “persistent intelligence supporting knowledge-based operations.”³²³ Frontex staff have also shared a stage with EDA representatives at numerous events, such as a 2012 conference co-hosted by the EDA and the Cyprus Presidency of the EU on ‘European Initiatives in the Maritime Environment: Future Capabilities, Technologies and Civil-Military Synergies’,³²⁴ a 2012 workshop co-hosted with the Austrian Ministry of Defence and Sports on ‘Doing Business with European Security and

Defence Bodies’,³²⁵ and the 2010 EDA annual conference on ‘Bridging Efforts’, where Frontex Joint Operations Unit chief Rustamas Liubajevs spoke on ‘Planning Capabilities for European Border Security – Towards a Structured Approach’.³²⁶

Millions of euros are being poured into drone research, in particular for border control, through the EU’s seventh Framework Programme, and this looks set to expand under the Horizon 2020 programme that follows FP7. Frontex plays an advisory role in the FP7 CLOSEYE project (see chapter 3) and the Agency also seems likely to benefit from two projects not directly related to drone research but directed instead at enhancing the border surveillance systems that will eventually incorporate unmanned vehicles. The **LOBOS** (LOW time critical BOrder Surveillance, awarded €2 million) project will “put emphasis on modelling, statistics and analysis, relying on satellite imagery but also on Open Source intelligence and other environmental information (meteorology, sea currents) to produce CONOPS



322 Thomas Strasser, 'Integrated Maritime Surveillance (IMS) – Common Information Sharing Environment (CISE)', 22 November 2011, http://www.statewatch.org/observatories_files/drones/eu/com-2011-ims-cise-presentation.pdf
 323 EDA, 'Specifications attached to the Invitation to Tender 10.CAP.OP.18 Intelligence Surveillance Reconnaissance ISR Capability Package Assessment Study (ICPA)', undated, http://www.statewatch.org/observatories_files/drones/eu/eda-2010-isr-tender.pdf
 324 EDA, 'Specifications attached to the Invitation to Tender 11.CAP.OP.133 "Practical Technical Guidelines for Developing Network Interoperability"', undated, http://www.statewatch.org/observatories_files/drones/eu/eda-2011-tender-network-interop.pdf
 325 Austrian Ministry of Defence and Sports & EDA, 'WORKSHOP 2013 – Doing Business with European Security and Defence Bodies', 12 June 2013, http://www.statewatch.org/observatories_files/drones/eu/eda-2013-eu-doing-business.pdf
 326 EDA, 'EDA's 2010 Annual Conference: "Bridging Efforts – Connecting Civilian Security and Military capability Development"', 9 February 2010, http://www.eda.europa.eu/info-hub/news/2010/02/08/EDA_s_2010_Annual_Conference_Bridging_Efforts_Connecting_Civilian_Security_and_Military_Capability_Development

[concepts of operations] products.”³²⁷ The **SAGRES** project (Services Activations for GRowing EUROSUR’s Success, awarded €3.4 million) is aimed at validating and further testing of tools designed for “tracking vessels on the high seas” as part of the EUROSUR project, including “monitoring of a specific third country port” and “tracking the identified vessel over high seas,” along with “monitoring of specific ports and stretches of third country coasts.”³²⁸

Frontex has also put out its stall at a number of the Commission’s events pushing for the insertion of drones into civilian airspace. At the Commission’s High-Level Conference in 2010, Erik Berglund gave a presentation entitled ‘UAVs for European Border Surveillance?’ This noted that satellites “are useful for intelligence gathering, but not for real time tracking,” while “UAVs have potential but must prove to be cost effective compared to manned flights.”³²⁹ At the first Commission UAS Panel workshop in July 2011 Edgar Beugels of Frontex was less hesitant than Berglund, giving a (very similar) presentation on ‘UAVs for European border surveillance’,³³⁰ and at the fifth workshop in February 2012 Zdravko Kolev offered a presentation on ‘RPAS potential for European border surveillance’.³³¹

6.4. Structured dialogue with the drone industry

Frontex has hosted a series of events to which manufacturers of drones and other aerial surveillance equipment have been invited to display their wares. In 2009, a workshop on “UAVs and Land Border Surveillance” was held in Imatra, Finland. Systems on display included the Orbiter, produced by *Aeronautics*, who describe it as:

*A compact and lightweight system designed for use in Military and Homeland Security missions. The system presents the ultimate solution for Over The Hill reconnaissance missions, Low Intensity Conflicts and Urban warfare operations as well as any close range ISR mission.*³³²

The Finnish firm *Patria Oyj* (who in 2005 won an EDA contract to develop digital line-of-sight & beyond line-of-sight datalinks for long-endurance drones) was also present, and its “mini-UAV”, the Modular Airborne Sensor System or MASS, was demonstrated. The system is “portable by two persons” and “consists of 1-3 UAVs with multiple payload options, communication suite and a ground control station on a ruggedized laptop-PC.” According to the brochure

for the system, “no piloting skills” are required as it can be “operated fully autonomously.”³³³ Other companies at the event in Finland included *Selex*, *Ahortec Ltd.*, and *SIM*, which displayed its SkyEye “quadrotor” drone, apparently purchased in 2007 by the Chinese police as well as other customers in Belgium, Bulgaria and the Netherlands.³³⁴

In January 2011 the Agency sought participants from “leading industries” for a border surveillance workshop to be held at its headquarters in Warsaw, focussing on “integrated sensor platforms for border surveillance at the EU external borders”, as well as looking at “other types of tools/platforms” such as drones. The workshop provided:

*An opportunity for up to four industry representatives to give brief presentations on concrete solutions for the deployment of integrated system solutions at borders. The presentations must focus on specific technological developments that will assist in the deployment of the border surveillance at the EU external borders.*³³⁵

September 2011 saw a follow-up to the demonstration event in Finland. Held over three days, the focus was not solely on UAVs, but also on aerostats and sensor systems which “could also play an important role in further enhancing border surveillance filling the gaps in the existing surveillance systems.” Making reference to EUROSUR, the call for expressions of interest said the workshop sought to:

*Allow end users and policy-makers to debate the main challenges related to UAV technology and its use for creating more efficient and effective green border surveillance and to present industry with the chance to demonstrate the capabilities of currently available technical solutions. The interoperability and integration of sensors and reporting systems will also be a main focus of the event.*³³⁷

Furthermore, the sessions aimed “to showcase in particular several of the latest developments in small Unmanned Aerial Vehicles and fixed ground surveillance solutions.” A subsequent article published by *Inter Press Service* (IPS) quoted Frontex spokesman Michael Parzyszek as saying that the agency had researched the possibility of using drones for border control “extensively” in 2010, although he “declined to give IPS details on development or deployment of any UAVs.”³³⁸

327 CORDIS, ‘LOBOS’, http://cordis.europa.eu/projects/rcn/106598_en.html

328 CORDIS, ‘SAGRES’, http://cordis.europa.eu/projects/rcn/106574_en.html

329 Erik Berglund, ‘UAVS for European Border Surveillance?’, 1 July 2010, http://www.statewatch.org/observatories_files/drones/eu/frontex-2010-berglund-presentation.pdf

330 Edgar Beugels, ‘UAVS for European Border Surveillance’, 12 July 2011, http://www.statewatch.org/observatories_files/drones/eu/frontex-2011-beugels-presentation.pdf

331 Zdravko Kolev, ‘RPAS potential for European border surveillance’, 9 February 2012, http://www.statewatch.org/observatories_files/drones/eu/frontex-2012-kolev-presentation.pdf

332 Aeronautics, ‘Orbiter UAV’, http://www.aeronautics-sys.com/orbiter_mini_uav_muas

333 Patria, ‘Modular Airborne Sensor System’, undated, http://www.patria.fi/fa2e2b004fc0a23ab1ebb7280c5127e4/Mini_UAV+-esite.pdf

334 Peter la Franchi, ‘SIM claims Sky-Eye quadrotor UAV sale to Chinese police’, 26 February 2007, <http://www.flightglobal.com/news/articles/sim-claims-sky-eye-quadrotor-uav-sale-to-chinese-police-212292/>

335 Frontex, ‘Invitation to participate in border surveillance workshop’, 25 January 2011, <http://www.frontex.europa.eu/news/invitation-to-participate-in-border-surveillance-workshop-o5SXjo>

336 Frontex, ‘Call for expressions of interest’, 7 June 2011, <http://www.statewatch.org/news/2011/jul/eu-frontex-uav-tender.pdf>

337 Frontex, ‘Call for expressions of interest’, 7 June 2011, <http://www.statewatch.org/news/2011/jul/eu-frontex-uav-tender.pdf>

338 Apostolis Fotiadis, ‘EUROPE: Drones may Track Migrants’, *Inter Press Service*, 1 November 2010, <http://www.ipsnews.net/2010/11/europe-drones-may-track-migrants/>



The following month, Frontex hosted a research and development workshop on the surveillance of sea (or “blue”) borders. An announcement from the agency said it would “showcase in particular several of the latest developments in Medium Altitude Long Endurance (MALE) UAVs but may include suitable small UAVs with Long Endurance as well.”³³⁹ Workshops and demonstrations were held in both Greece and France, with a strong showing from Israeli companies: *Israel Aircraft Industries*; *Aeronautics Defense Systems*, demonstrating their “Dominator II” vehicle; and *Bluebird Aero Systems*, with the *SpyLite* “multi configuration tactical UAS... operated successfully in combat conditions for the Israeli Defense Forces”.³⁴⁰

Also present were the French firm *Sagem* to demonstrate the *Patroller* (“a family of 1 ton-class long-endurance UAV systems adapted to nation states’ growing defense and homeland security needs”³⁴¹); *Lockheed Martin*;³⁴² and *Aerovisión* who presented the *Fulmar* UAV, displaying “its capacity to integrate with maritime surveillance systems such as radars,

[which is] a crucial aspect in this type of unmanned aerial surveillance system.”³⁴³ In total, six aircraft were demonstrated in Greece and France: one medium-altitude long endurance (MALE) drone; two optionally piloted aircraft; one small long-endurance drone; and two small drones.³⁴⁴

In April 2012, Frontex hosted another drone workshop, this time in Bulgaria. The title of the event reflected a change in tack for those interested in normalising the use of drones: shifting away from the language of Unmanned Aerial Systems or Unmanned Aerial Vehicles, the April event was called the ‘RPAS [Remotely Piloted Aircraft System] Border Surveillance Workshop 2012’.³⁴⁵ The purpose of the event also suggests that the inclusion of OPAs in previous demonstrations had caught the imagination of Frontex. The aim was to:

Present and debate the potential of RPAS and OPA [Optionally-Piloted Aircraft] for European border surveillance and SAR operations, address-

340 BlueBird Aero Systems, ‘SpyLite’, 2009, http://testing.alanlanguirand.com/jj/wp-content/uploads/2011/02/SpyLite_brochure_2009.pdf

341 Safran, ‘Patroller MALE UAV Systems’, <http://www.sagem-ds.com/spip.php?rubrique37&lang=en>

342 Lockheed Martin, ‘Lockheed Martin Demonstrates Advanced Airborne Border Surveillance in Europe’, <http://www.lockheedmartin.com/us/news/press-releases/2011/november/AirborneBorderSurveillance.html>

343 Thales, ‘Thales and Aerovisión present frontex with an unmanned aerial vehicle for border control’, 16 January 2012, http://www.thalesgroup.com/Press_Releases/Countries/Spain/2012/Thales_and_Aerovisi%C3%B3n_present_frontex_with_an_unmanned_aerial_vehicle_for_border_control/

344 Zdravko Kolev, ‘RPAS potential for European border surveillance – Land and maritime surveillance, border control’, 9 February 2012, <http://www.statewatch.org/news/2013/may/eu-frontex-zdravko-kolev-border-surveillance-feb-2012.pdf>

345 Frontex, ‘RPAS border surveillance workshop 2012 – invitation’, <http://www.frontex.europa.eu/news/rpas-border-surveillance-workshop-2012-invitation-u4f1e1>

ing topics like: the technical and operational features, payloads, data-links, legislation, to buy services or the product – a business, cost-efficiency, comparisons with classical aerial surveillance, best practices and lessons learned.

The event also aimed to give “end-users and industry the opportunity to meet each other and to exchange their views, experience and needs.”

Zdravko Kolev, Frontex research officer and one-time recipient of *Unmanned Vehicle Systems International's* Catherine Fargeon award (see chapter 2), posted a summary of the event on the UAS Vision website (“a global forum for the unmanned aircraft systems community”):

This successful event was organised by Frontex in cooperation with the Chief Directorate Border Police of Bulgaria and featured 33 speakers. The workshop was attended by the EU Member States authorities involved in border control of Bulgaria, Estonia, Finland, France, Germany, Italy, Latvia, Lithuania, Netherlands, Poland, Portugal, Romania, Spain as well as by representatives of EASA, EUROCONTROL, JRC, Bulgarian Information Office for GMES (BIOG), Bulgarian Academy of Science – Centre for National Security and Defence Research (CNSDR) and Space Research and Technology Institute (SRTI), Frederick University – Cyprus, Tony Henley Consulting Ltd, United Nations Office on Drugs and Crime and 25 technology providers.

He continued:

This technology is of particular interest of Frontex and EU Member states for improving the capacity to detect and track small and unseaworthy vessels, which are being used on a regular basis for irregular migration and cross-border crime (e.g. drug smuggling). The use of such vessels has multiplied the death toll of migrants drowning when trying to reach EU shores... RPAS technology might offer great potential by improving the aerial surveillance capacity resulting in more lives saved.³⁴⁶

6.5. Critical perspectives

Claims that drones and other technological innovations could save migrants' lives are frequently made by proponents of the deployment of the technology for the purposes of border surveillance and control. Following the deaths of hundreds of migrants off the coast of Lampedusa in early October 2013, European Commissioner President Jose Manuel Barroso argued that:

We need also to strengthen our capacity for search and rescue, and our surveillance system to track boats, so that we can launch a rescue operation and bring people to safe grounds before they perish. I think the kind of tragedy we have witnessed here so close to the coast should never happen again. Our initiative 'EUROSUR' is meant to do that.³⁴⁷

In fact there is no obligation under the EUROSUR legislation to ensure that Member States or Frontex initiate search and rescue operations should their plethora of surveillance tools locate a vessel in distress, and Mediterranean Member States have fiercely resisted attempts to insert binding search and rescue clauses in other EU legislation.³⁴⁸ Making humanitarian use of imagery obtained from drones or other surveillance technologies will likely remain a matter of political will, and it is by no means certain that – without significant advances in technology and enormous expenditure – that aerial surveillance technology would be able to track rubber dinghies and other small vessels effectively.

Ska Keller, a German Green MEP, has argued that “drones are very expensive and they don't help. Even if a drone detects a vessel, it can't do anything for them. You need to have actual people there, and having a drone doesn't guarantee that.”³⁴⁹ Keller argues that “the way forward is not drones but improved, Europe-wide standards for asylum seekers and more solidarity and burden-sharing among member states.”³⁵⁰

Frontex's relationship with industry has also raised questions. A series of articles in *Inter Press Service* detailed payments made to numerous defence and security contractors in return for technology demonstrations at the events organised by the Agency outlined above. Thousands of euros were given to major industrial interests for participating in Frontex trials in France and Greece. The agency told *Inter Press Service* in January this year that “in the case of companies Lockheed Martin, FAST Protect AG, L-3 Communications, FLIR Systems, SCOTTY Group Austria, Diamond

346 Peter van Blyenburgh, 'Frontex organizes RPAS border surveillance workshop, UAS Vision, 19 March 2012, <http://www.uasvision.com/2012/03/19/frontex-organizes-rpas-border-surveillance-workshop/>

347 'Statement by President Barroso following his visit to Lampedusa', 9 October 2012, http://europa.eu/rapid/press-release_SPEECH-13-792_en.htm

348 Steve Peers, 'EU rules on maritime rescue: Member States quibble while migrants drown', *Statewatch Analysis*, 22 October 2013, <http://www.statewatch.org/analyses/no-243-eu-search-and-rescue.pdf>

349 Barry Neild, 'EU plans controversial drones to track migrants', *Global Post*, 20 July 2012, <http://www.globalpost.com/dispatch/news/regions/europe/120719/eu-drones-migrants>

350 Apostolis Fotiadis and Claudia Ciobanu, 'People pay for research against migrants', *Inter Press Service*, 11 January 2013, <http://www.ipsnews.net/2013/01/people-pay-for-research-against-migrants/>

Airborne Sensing and Inmarsat, it (the reimbursement) was €30,000.” The Agency went on to say that “the payments made to the companies to cover the costs incurred by them to participate in the demonstration in Aktio [Greece] varied from €10,000 to €198,000.”³⁵¹ Payments of public money to private companies for participation in events, trials and research that will eventually benefit those same enterprises is a reoccurring feature of relationships at EU level between the drone industry and public officials.

Frontex’s interest in Israeli drone technology has also raised questions. As noted above, *Bluebird Aero Systems* has demonstrated its *SpyLite* drone that has “operated successfully in combat conditions for the Israeli Defense Forces”³⁵² and numerous other Israeli technology companies have participated in Frontex-organised events. In response to enquiries about its relationship with *Israel Aircraft Industries*, in which the claim was made that *IAI* is “a company known to have profited from crimes against humanity”, a spokesperson for Frontex stated that “the fact that [*IAI*’s technology] has been used for other purposes cannot prevent us from looking at this technology.” Frontex has not yet purchased or leased any *IAI* technology, but if it were

to do so questions would likely arise as to whether the funding of a company deeply intertwined with the occupation of Palestine is compatible with the Agency’s fundamental rights obligations.³⁵³

6.6. Transparency and accountability

As with other EU agencies (for example the EDA), one problem for anyone wishing to understand exactly what Frontex is doing and why is the agency’s lack of transparency, a problem related to and compounded by its lack of democratic accountability. While Frontex provides a significant amount of information to the public via its website and publications, the content of this material is of course decided by agency itself and there are few opportunities for more significant interrogation of the agency by democratic bodies.

This is not merely a problem related to particular aspects of the agency’s work. An analysis in *European Security Review* argues that “there remains a lack of clarity as to the agency’s precise role and responsibility in the management of EU external borders.” Furthermore:

351 Apostolis Fotiadis and Claudia Ciobanu, ‘Closing Europe’s borders becomes big business’, *Inter Press Service*, 9 January 2013, <http://www.ipsnews.net/2013/01/closing-europes-borders-becomes-big-business/>

352 BlueBird Aero Systems, ‘SpyLite’, 2009, http://testing.alanlanguirand.com/jj/wp-content/uploads/2011/02/SpyLite_brochure_2009.pdf

353 David Cronin, ‘EU border agency shops around for Israeli warplanes’, *Electronic Intifada*, 13 February 2012, <http://electronicintifada.net/blogs/david/eu-border-agency-shops-around-israeli-warplanes>

*The line of accountability within the Agency's organisational structure also does not lend itself in the direction of transparency. The relationship between its legal mandate and the specific roles and responsibilities that exist within the organisation are not made clear to the public or the European Parliament... its Management Board is Member State dominated and the operational agreements constituting the foundations of operations remain secret.*³⁵⁴

There are numerous grounds on which Frontex has been criticised,³⁵⁵ but in relation to the use of drones a number of specific points can be made. Firstly, with regard to Frontex's hosting of demonstration events and engagement with research, the information about these events that Frontex makes public largely extends to invitations for companies to participate in them. The dubious relationship between the agency and the corporations involved which has seen thousands of euros of public money go towards these companies has only come to light due to the work of journalists, when arguably it should have always been made clear. Whether such payments should have been made at all is also questionable, given that it is the participating companies who potentially stand to benefit financially should Frontex's acquire or lease their technology.

Secondly, the purpose of drones used by Frontex in joint operations is not entirely clear. As noted above, EU officials have claimed that the use of drones and other surveillance technologies is aimed at saving the lives of migrants travelling in unseaworthy vessels. Yet the legislation underpinning EUROSUR, in the framework of which much of this surveillance will take place, contains no provisions on taking measures to save lives once such vessels have been detected. The desirability of and reasoning underpinning the increasingly pervasive aerial surveillance of the Mediterranean remain highly questionable, but if it is to take place then it should be primarily geared towards saving lives and this should be made clear in legislation.

Thirdly, there should be greater clarity over Frontex's wider involvement in research and development activities. Since the 2011 amendment to its grounding legislation, Frontex has been able to "participate in the development of research relevant for the control and surveillance of external borders".³⁵⁶ Just as the Commission's security research has been made subject to greater ethical scrutiny in recent

years, Frontex's role in research and development should arguably be subjected to similar questioning and enhanced oversight.

6.7. The shape of wings to come

Frontex's 2013 Work Programme³⁵⁷ shows continuation of the Agency's interest in border surveillance. It outlines a series of objectives for its 'Border Surveillance Development Programme', which is allotted €580,000 – an increase of €230,000 on the 2012 budget for the same programme, despite a near-€4 million decrease in overall budget. €450,000 is devoted to 'All Eyes: Aerial, Ground and Sea Surveillance – sensors and platforms and advanced systems solutions', and €130,000 to the 'Border Security Research Bridge', which aims at "coordinating and enhancing the direct involvement of the Border Guard community in planning research activities and shaping mid- and long-term research agenda".³⁵⁸

There are four objectives for the 'All Eyes' programme:

- Boost Member State awareness of new developments in the field of sensors, platforms and advanced system solutions;
- Catalogue existing practices and identify areas where best practices could be developed in relation to border surveillance;
- Examine and validate the detection capabilities and applicability of the existing surveillance tools and technologies in an operational environment; and
- Facilitate the deployment of new technologies for border surveillance as pilots in Member States and/or in the context of Joint Operations coordinated by Frontex.

The "outputs" foreseen for these objectives are based on "feedback received from Member States and the European Commission or on developments that have been identified through R&D activities".³⁵⁹ Five of the seven outputs are relevant to the ongoing attempt of the Agency to ensure pervasive aerial surveillance of the EU's external borders.

The first is an "Aerial Border Surveillance Trial with manned aircraft with optionally piloted aircraft capability equipped with multi-intelligence sensors and report",

354 Aoife Spengeman, 'Upholding the Legitimacy of Frontex: European Parliamentary Oversight', March 2013, p.4, <http://www.isis-europe.eu/sites/default/files/publications-downloads/esr65%20-%20Frontex%20-%20AS.pdf>

355 For example its commitment to its human rights obligations; the content and scientific quality of its risk analyses; the accountability of officers taking part in Frontex-led joint operations; decisions to continue running operations when there is a risk of human rights violations, and so on. For more information see: Statewatch and Migreurop, 'Reply to the Ombudsman's request for submission – Frontex's fundamental rights strategy', 27 September 2012, <http://www.statewatch.org/analyses/no-193-eu-ombs-inquiry-frontex-evidence.pdf>; Aoife Spengeman, 'Upholding the Legitimacy of Frontex: European Parliamentary Oversight', March 2013, p.4, <http://www.isis-europe.eu/sites/default/files/publications-downloads/esr65%20-%20Frontex%20-%20AS.pdf>; and Council of Europe Committee on Migration, Refugees and Displaced Persons, 'Frontex: human rights responsibilities', 8 April 2013, http://www.statewatch.org/observatories_files/drones/eu/coe-2013-frontex-hr-responsibilities.pdf

356 Steve Peers, 'The Frontex Regulations – Consolidated text after 2011 amendments', *Statewatch Analysis*, 2011, <http://www.statewatch.org/analyses/no-140-frontex-reg-text.pdf>

357 Frontex, 'Programme of Work 2013', http://www.statewatch.org/observatories_files/frontex_observatory/Frontex%20Work%20Programme%202013.pdf

358 Frontex, 'Programme of Work 2013', p.109, http://www.statewatch.org/observatories_files/frontex_observatory/Frontex%20Work%20Programme%202013.pdf

359 Frontex, 'Programme of Work 2013', p.106, http://www.statewatch.org/observatories_files/frontex_observatory/Frontex%20Work%20Programme%202013.pdf

which does not appear to have been entirely successful. On the back of demonstration events in 2012, Frontex awarded in January 2013 a contract to the Austrian firm *Scotty Group* to take part in the 'Aerial Border Surveillance Trial 2013', through which an OPA, a Diamond DA-42 modified so that it can fly with or without a pilot on board, was supposed to be flown for two weeks in surveillance missions at the Greek-Turkish border.³⁶⁰ OPAs "are useful because they circumvent EU laws which prohibit fully unmanned drones from flying in commercial airspace." However, the demonstration never took place as the Greek government would not provide a flight licence, but "Frontex does not rule out organising future OPA test runs".³⁶¹

The second "output" directly related to aerial surveillance technologies is a "Demo of MALE Remotely Piloted Aircraft (RPA) in an operational environment and report". Little is known about this project. Frontex has yet to issue a call for tender seeking a drone, although it is likely to receive a number of offers when it does – its workshops in France and Greece were well-attended and largely focused upon MALE drones.

The third is the organisation of a Workshop on Persistent Wide Border Area Surveillance. Developed for military purposes, wide area surveillance systems are seen as an advance on "traditional" intelligence, surveillance and reconnaissance (ISR) systems which:

*[E]ither looked at a large area without the ability to provide detailed resolution of a particular object or provided high resolution views of specific targets, the so-called "soda straw" perspective. Traditional systems could not provide both wide area and narrow focus ISR.*³⁶²

Wide area surveillance systems, on the other hand, can "continuously monitor a relatively large area and simultaneously focus in on multiple specific locations or targets".³⁶³ They can provide "city-size fields of view and instantly search through terabytes of data" and are currently being produced by various defence and security contractors in-

cluding *Exelis*,³⁶⁴ *Lockheed Martin*³⁶⁵ and *BAE Systems*, which describes its Airborne Wide Area Persistent Surveillance System as "an unblinking eye in the sky commanding a persistent watch over troubled areas to provide decision makers with useful and focused information".³⁶⁶ The systems are frequently deployed on manned planes and aerostats (the US Department of Homeland Security "is vetting surveillance blimps as possible additions to its Southwest border fleet of unmanned aircraft"³⁶⁷), but they are also used on military drones such as the Reaper³⁶⁸ and Erik Berglund of Frontex has argued that "the sea surveillance mission that could be performed by UAVs includes wide area surveillance under most weather conditions".³⁶⁹ The ARGUS system – funded by the US Defence Advanced Research Projects Agency and "capable of high-resolution monitoring and recording of an entire city" – provides a potent example of what the technology is capable of.³⁷⁰ As with the proposed test flight of a MALE drone, it is unclear when the Workshop took place (if at all) or which institutions and organisations were or will be involved.

Frontex also planned to commission an "outsourced study on technological integration for solutions for under foliage detection and their potential impact on border surveillance" and devise an "elaborated CONOPS [concept of operations] detecting and tracking of small boats". The elaboration of CONOPS will take place "in relation with the EU FP7 activities, aiming to optimise synergies with activities that are supported by other EU funding".³⁷¹ The Agency's Work Programme does not mention to which FP7 activities in particular this statements refers, but presumably it is the LOBOS, SAGRES and CLOSEYE projects noted above.

The other outputs for the 'Border Surveillance Development Programme' are "testing of integrated mobile land surveillance equipment during a JO [Joint Operations] and report" and "creation of a Working Group and development of minimum technical requirements and/or guidelines on integrated mobile land surveillance system".³⁷²

360 'Frontex: "optionally-piloted" aircraft tests, but no drones... yet', *Statewatch News Online*, 29 May 2013, <http://database.statewatch.org/article.asp?aid=32371>

361 Nikolaj Nielsen, 'EU looks to 'hybrid drones' for legal shortcut on migration', *EUobserver*, 14 October 2013, <http://euobserver.com/priv-immigration/121735>; see also 'Frontex cancels surveillance plane contract due to lack of interest from companies', *Statewatch News Online*, 18 October 2013, <http://www.statewatch.org/news/2013/oct/frontex-plane1.htm>

362 Lexington Institute, 'Wide Area Persistent Surveillance Revolutionizes Tactical ISR', *Defence Talk*, 30 November 2012, <http://www.defencetalk.com/wide-area-persistent-surveillance-revolutionizes-tactical-isr-45745/>

363 Ibid.

364 Exelis, 'Sierra Nevada Corporation and ITT Exelis achieve testing milestone for advanced Wide-Area Persistent Surveillance System', 8 June 2012, <http://www.exelisinc.com/news/pressreleases/Pages/Sierra-Nevada-Corporation-and-ITT-Exelis-achieve-testing-milestone-for-advanced-Wide-Area-Persistent-Surveillance-System.aspx>

365 Lance M. Bacon, 'System gives troops 360-degree eye in the sky', *Army Times*, 16 April 2012, <http://www.armytimes.com/article/20120416/NEWS/204160317/System-gives-troops-360-degree-eye-in-the-sky>

366 BAE Systems, 'Airborne Wide-Area Persistent Surveillance System (AWAPSS)', http://www.baesystems.com/product/BAES_028067/airborne-wide-area-persistent-surveillance-system-awapss

367 Aliya Sternstein, 'DHS eyes military blimp to stop illegal border traffic', *Nextgov*, 6 April 2012, <http://www.nextgov.com/defense/2012/04/dhs-eyes-military-blimp-to-stop-illegal-border-traffic/50980/>

368 Frank Colucci, 'Persistence On Patrol', *Avionics Today*, 1 May 2013, http://www.aviationtoday.com/av/issue/feature/Persistence-On-Patrol_79069.html

369 Eric Berglund, 'The potential of UAS for European Border Surveillance', http://www.uasresearch.com/UserFiles/File/042_Contributing-Stakeholder_Frontex.pdf

370 Jay Stanley, 'Drone 'Nightmare Scenario' Now Has A Name: ARGUS', *American Civil Liberties Union*, 21 February 2013, <https://www.aclu.org/blog/technology-and-liberty-free-speech-national-security/drone-nightmare-scenario-now-has-physical>

371 Frontex, 'Programme of Work 2013', p.109, http://www.statewatch.org/observatories_files/frontex_observatory/Frontex%20Work%20Programme%202013.pdf

372 Frontex, 'Programme of Work 2013', p.62, http://www.statewatch.org/observatories_files/frontex_observatory/Frontex%20Work%20Programme%202013.pdf

Meanwhile, the development of EUROSUR continues apace, with enthusiasm for the deployment of military and quasi-military means boosted by disasters such as the death of hundreds of migrants off the coast of Lampedusa in October 2013. The same month, the European Parliament agreed to the legislation governing the system (several years after work had begun on its development),³⁷³ and Frontex's work on EUROSUR "is conducted across all parts of the Agency". It "has the objectives to set up a core-EUROSUR network interlinking NCCs [National Coordination Centres] and Frontex, and to develop the Frontex contribution to the EUROSUR information exchange."³⁷⁴

Imagery from satellites (specifically the Copernicus project run by the Commission and ESA) will be complemented with that obtained from aerial surveillance flights, as well as radars, cameras and sensors. EUROSUR became operational on 2 December 2013 with 19 countries (18 EU member states and Norway, a Schengen Associated Country) participating. By 1 December 2014 it is expected that 8 other EU member states and 3 more Schengen Associated Countries will have been connected to the system. The role of Frontex involves "bringing together and analysing in the 'European situational picture' information collected by Member States, thereby detecting changing routes or new methods used by criminal networks."³⁷⁵

The unresolved legal questions over unmanned drone flights in civilian airspace may see Frontex invest its resources in OPAs rather than fully unmanned vehicles. Director Ilka Laitinen has said that although "technologically speaking, it [UAVs] seems to be a reliable and cost-effective means for surveillance," it remains the case that "there are many legal questions to be solved."³⁷⁶ Similarly, in a chapter for the UVS International 2012 Yearbook, Zdravko Kolev said that:

*In summary, the European Union is giving increased priority to security on the EU's external borders. RPAS have the potential to play a major role in providing surveillance of European border areas. However, in order to realise their potential and in order for end-users to consider the use of RPAS, the critical issue of operating RPAS in civil managed airspace urgently needs to be resolved. Overall, RPAS still need to prove both their safety and their cost-effectiveness, in order to be considered a relevant surveillance asset.*³⁷⁷

A spokesperson for Frontex said in May 2013 that at the minute "no decision has been taken on whether to acquire [drone] technology for testing." The recent enthusiasm for OPAs as a way to overcome restrictions on the use of entirely unmanned drones seems to suggest that it is the ends of eye-in-the-sky surveillance and control over the EU's external borders that is of most interest to the agency, rather than the specific means by which it is carried out. Yet the compatibility of such a vision of border control with fundamental rights continues to be questioned. The European Parliament's Human Rights Committee was told in May 2013 by a representative of François Crépeau, United Nations Special Rapporteur on the human rights of migrants, that the EU's policy on irregular migration, which is increasingly geared towards preventing the arrival of irregular migrants and detaining those who do make it to Europe, is "fundamentally at odds with the human rights approach concerning the conceptualisation of migrants as individuals and equal holders of human rights."³⁷⁸

373 European Parliament press release, 'Border surveillance: MEPs approve EUROSUR operating rules', 10 October 2013, <http://www.europarl.europa.eu/news/en/news-room/content/20131007IPR21624/html/EU-border-surveillance-MEPs-approve-EUROSUR-operating-rules>

374 Frontex, 'Programme of Work 2012', p.28, <http://www.statewatch.org/news/2012/jan/eu-frontex-2012-wp.pdf>

375 European Commission, 'EUROSUR kicks off: new tools to save migrants' lives and prevent crime at EU borders', 29 November 2013, http://europa.eu/rapid/press-release_IP-13-1182_en.htm

376 Nikolaj Nielsen, 'Frontex chief looks beyond EU borders', *EUobserver*, 14 January 2013, <http://euobserver.com/fortress-eu/118471>

377 Zdravko Kolev, 'RPAS for European Border Surveillance – Challenges of Introducing RPAS Technology in an Operational Context', *UVS International Yearbook 2012*, p.51, http://uvs-info.com/index.php?option=com_flippingbook&view=book&id=13&page=1&Itemid=686

378 EU policy on irregular migration is "fundamentally at odds with the human rights approach", *Statewatch News Online*, 23 May 2013, <http://database.statewatch.org/article.asp?aid=32347>

The military exerts far too much influence over science, engineering and technology in the UK and elsewhere - and this leads to an over-emphasis on weapons and technology based approaches to tackling conflict. We believe there needs to be a major shift in both resources and emphasis away from military science and technology towards areas such as cleaner technology, research on non-violent conflict resolution, and science and technology for poverty alleviation. The concept of 'Security' also needs to be considered much more broadly to include many of the pressing issues that face the world today - issues which can be addressed by drawing upon the expertise that resides in science and technology.

'Military influence on science and technology',
Scientists for Global Responsibility³⁷⁹

7. Conclusions and recommendations

7.1. A policy designed by the drone industry, for the drone industry

This report has attempted to summarise the EU's emerging drone policy. It has analysed the origins and development of that policy and examined EU-funded research and development and the activities of the European Defence Agency, European Space Agency, Frontex and other EU bodies. It has tried to weave together a fragmented set of monotonous policy developments so that the people and parliaments of Europe, who as yet have had no meaningful input whatsoever into what is a rapidly maturing process, are able to see the bigger picture.

Despite the plethora of initiatives, the EU's drone policy has coalesced around a decision taken by the European Commission – with no further debate - that drones should be introduced into civilian airspace as soon as is practicably possible. This has induced the requisite central planning, policymaking apparatus and a roadmap to achieve this objective over a 20 year period. It has also entailed EU funding of at least half a billion euros and counting – the majority of which has been handed to big corporations.

The EU's drone agenda has been shaped by thinly accountable officials and the representatives of corporations who are developing combat, surveillance and security drones and want European (and other) governments to buy them. It is true to only a limited extent that the EU is funding genuine innovation across the unmanned aerial vehicle sector (in line with its R&D mandate). Regardless, the problem is not that the EU is subsidising drone R&D per se; it is that the agenda is so heavily skewed toward the interests of the big defence contractors.

The primary objective of these companies is to generate profits for their shareholders, in this instance via demand for drones in their core military markets. But given the current absence of strong demand from the member states, the development of security, surveillance and other drones offers both EU subsidies for new applications and an "enabling environment" tailored to the needs of all large drone users.

There are already many situations in which a diverse range of organisations and individuals – from farmers, emergency services, environmental monitors to surveyors, journalists, activist groups and hobbyists – have already found novel and legitimate uses for drones of one sort or another. But, and not least because drones under 150kg are largely outside the scope of the EU's interests, it is hard to see how the broad thrust of the current R&D agenda is going to help them develop the devices they need.

³⁷⁹ <http://www.sgr.org.uk/projects/military-influence-scitech>

Our fear, given the current focus on security applications and border controls, is that the only thing that will “trickle down” from the current EU R&D agenda is more unwarranted state surveillance and repression and enhanced prospects for a global arms race in respect to combat drones. It is important to stress that this is not some kind of unavoidable side effect of drone innovation; it is a policy choice expressed through the exercise of unchecked powers over public expenditure and regulatory decision-making. It is hard to imagine that this is a policy choice that many sufficiently-informed people would support.

It is also important to stress that the current policy trajectory is not simply one of the European Union’s making; many national governments are equally enthusiastic and their wishes both shape and constrain the activities of EU bodies. Nevertheless the EU has emerged, by default as much as by design, as the most important single actor in terms of opening Europe’s skies to drones. With these concerns in mind, it is crucial that long-overlooked mechanisms for checking militarisation and safeguarding peoples’ rights are urgently pursued.

7.2. Increase accountability, transparency and democratic control of EU drone policy

Those responsible for developing the EU’s drone policy are not subject to anything like the minimal democratic control that is exercised over EU legislative measures or national public expenditure. This is a generic feature of “non-legislative” EU policymaking around which there is very little or no scope for debate, oversight or civil society participation.

With respect to drones these problems are compounded by the innately technocratic desire to manage the process through “roadmaps” and other policy missives devised in secret by public officials, consultants and lobbyists. As noted in chapter 2, the entire process appears to have been designed precisely to avoid any substantive discussion or debate by pre-defining policy objectives and outcomes.

The European and national parliaments could challenge these profoundly undemocratic processes if they had the will or mandate to do so. A simple first step would be for the European and national parliaments to establish all party groups/committees dealing with issues relating to the domestic and international development and use of drones. This has already happened in the UK, where MPs have established the All Party Parliamentary Group on Drones in order to “examine the use of drones (unmanned aerial vehicles) by governments, for domestic and international, military and civilian purposes”.³⁸⁰

A European Parliamentary Group on Drones could at least conduct basic scrutiny of European Commission spending and the activities of EU agencies with regard to drones. In an era in which the harmonisation of national laws and policies through European integration has increasingly been superseded by the creation of a much more sophisticated EU security architecture – comprising executive agencies, surveillance systems and operational cooperation – it is imperative that the EP give serious consideration to such initiatives.

The minimal democratic control and influence that citizens have over EU legislation does not exist in respect to “non-legislative” measures. The research in this report is a case in point. With parliaments and civil society all but entirely excluded from “operational matters”, the executive branches of the European Commission and Council creating this new EU security architecture, developing technological and regulatory solutions for ‘domestic’ drone flight, and taking decisions on funding for both civilian and military drone research, must be subject to new mechanisms for transparency, accountability and democratic control.

At present there are few if any mechanisms in place that provide for the proper scrutiny of the exercise of delegated powers by EU bodies and officials. These bodies increasingly develop and implement policy, in conjunction with equally unaccountable EU law enforcement agencies, in secretive forums that are beyond the radar of most of Europe’s journalists, and beyond the comprehension of most of its people. As a result, the European Commission has largely avoided public debates about EU expenditure on security and its potential impact on civil liberties. Bean-counting audits (which are concerned only with detecting fraud against the Community budget), blithe periodic “reviews” and the occasional glossy brochure fall far short of the kind of accountability that is required.

When questions about legitimacy and impact do arise, it is inevitably after the event. Beyond a few overstretched MEPs, EU officials and reviewers, there is no concerted attempt to ensure that EU taxpayers are getting value for money or that security or other projects are delivering what they promise – never mind whether fundamental issues of civil liberty and human rights are being properly safeguarded in the long-term.

It is now vital for campaigners, activists and civil society organisations to place pressure on officials and elected representatives to ensure that a more democratic framework is put into place. While drones are, rightly, of considerable interest to those involved in the peace and anti-militarist movements, the ongoing push towards ‘domestic’ drone use should also ring alarm bells amongst privacy, data protection, civil liberties and police monitoring advocates.

³⁸⁰ ‘All-Party Parliamentary Group on Drones’, 5 December 2013, <http://www.publications.parliament.uk/pa/cm/cmallparty/register/drones.htm>. The initial focus of the APPG is “the use of drones by the United States in Pakistan, Yemen, Somalia and elsewhere; their use by the UK internationally; and their use domestically in the UK by police forces and others. Within these themes is a need to examine the legal and ethical frameworks which govern the use of drones”. See further: ‘All Party Parliamentary Group on Drones’, <http://appgondrones.wordpress.com/about-2/>

If EU drone policy is to attain any political credibility or public support, the entire policy-making process needs to be brought under meaningful democratic control. If the parliaments of Europe do not ultimately take a stand, there is little prospect of this happening, and the gulf between the EU and the people will only continue to widen. The symbolism of an EU that is developing drones to police its citizens cannot be understated.

7.3. Devise an R&D policy that fosters innovation rather than militarisation

The EU's R&D agenda supports the manufacturers of combat drones in the name of both adapting them to enhance European security and supporting Europe's industrial base to ensure that it can compete in the burgeoning global market for "homeland security". *Statewatch* has repeatedly expressed concerns that this approach can only be relied upon to produce highly militaristic security applications in the first instance and subsidies for the large defence and IT contractors that already dominate the homeland security industry in the second. The research in this report confirms our previous findings.

As explained in chapter 3, the new seven-year 'Horizon 2020' programme, which will commence in 2014, is only likely to exacerbate the structural problems of its predecessors thanks to a trebling in security research funding and an even greater prioritisation of innovation that leads to "growth and jobs". Despite evidence that spending on the defence industry is among the least efficient means of job creation open to governments,³⁸¹ the EU is apparently wedded to the principle that the reverse is true.

At the micro-level, the problems with the way the security R&D budget is drawn up and distributed mirror those described above: there is no meaningful democratic input into the setting of research priorities beyond the blind acceptance of vague categories like counter-terrorism, border control, crisis management etc., and no democratic input into the content of the annual calls for proposals. In this context, the security research programme has become a test-bed for the technologies underpinning EU policy initiatives like EUROSUR (the EU Border Surveillance System), "smart borders" and police and security drones.

Unless the European and national parliaments subject the Horizon 2020 programme to much greater scrutiny and control than previous EU framework research programmes, the next seven years will see hundreds of millions more euros spent on the drones already being developed by Europe's military-industrial complex.

It also matters that the ostensible prohibition on the European Commission funding military R&D is all but meaningless in the absence of strict rules that differentiate "dual use" research. This is not to say that civil research into the application of technologies developed by or for the military is illegitimate, but that unless it is subject to greater scrutiny than non-military R&D, it is inevitable that the EU will end up funding military research by the 'back door', as appears to be the case with some of the EU-funded drone research. Since there is precious little scrutiny of any EU-funded security R&D, there is a mountain to climb in terms of reframing the agenda toward more legitimate and less dangerous investments.

The contours of an alternative EU framework for innovation are beyond the scope of this paper, suffice to say that research that will make Europe (and the world) an environmentally sustainable, healthy and peaceful place to live must be prioritised over military and security technologies into which private entities are already ploughing their vast reserves of cash. There is no need for these investments to be further amplified with public money.

7.4. Set out a meaningful agenda for the protection of peoples' rights

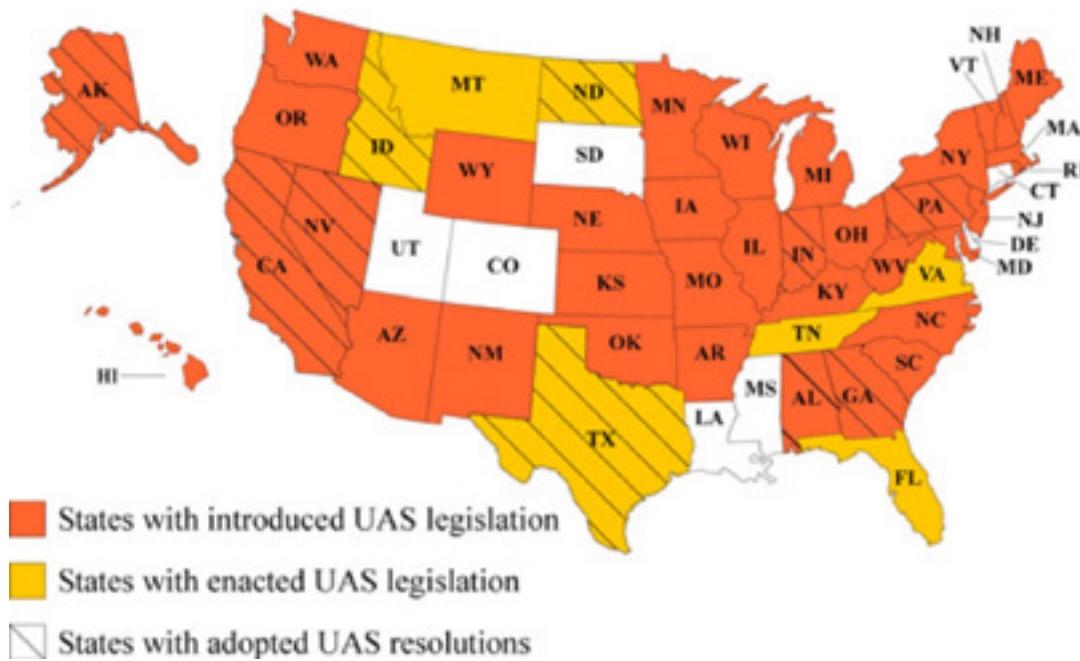
The European Union is subsidising the development of drones and establishing the regulatory environment in which they can be used without taking meaningful action to protect the rights of its citizens. As noted in chapter 2, the position largely taken so far is that from a fundamental rights perspective, all that matters is ensuring that drones process all of the data they capture in accordance with EU data protection law. This completely misunderstands many of the reasons why people are concerned about drones in the first place.

It is helpful to consider the debates around the use of drones in the USA, where the Federal Government is already using drones for a wide range of military, counter-terrorism and domestic security purposes – be that to assassinate terror suspects abroad, conduct surveillance of citizens at home, or patrol the US-Mexico border for migrants. When an ex-policeman went on a killing spree in California earlier this year there was palpable concern that armed drones could be deployed domestically for the first time. Concerns around drone applications and technologies have led to a rash of state legislation. By June 2013, all but seven US states had proposed or adopted legislation relating to the domestic use of drones in their domestic airspace, according to the National Conference of State Legislatures (see map, over).³⁸²

³⁸¹ Frank Slijper, 'Military spending and the EU crisis infographic', *Transnational Institute*, 13 May 2013, <http://www.tni.org/article/military-spending-and-eu-crisis-infographic-0>

³⁸² National Conference of State Legislatures, '2013 Unmanned Aircraft Systems (UAS) legislation', <http://www.ncsl.org/issues-research/justice/unmanned-aerial-vehicles.aspx>; see also Allie Bohm, 'Status of Domestic Drone Legislation in the States', *American Civil Liberties Union*, 15 February 2013, <http://www.aclu.org/blog/technology-and-liberty/status-domestic-drone-legislation-states>

States With UAS Legislation



There is massive variation across the USA but the features of this legislation include:

- requirement of a “probable cause” warrant in order for law enforcement to use drones to collect information to use against someone in court;
- an explicit ban on the weaponisation of drones;
- special protections from aerial surveillance for farmers or ranchers;
- reporting requirements on law enforcement agencies’ drone usage;
- requirement for law enforcement agencies to justify to local governing bodies their need for drones before they acquire one;
- limitation of usage to felony crimes;
- prohibition on law enforcement identifying anyone or anything other than the target that justified the warrant and drone deployment;
- stipulation that information that is incidentally collected cannot be used in court;
- requirements to delete incidental data within 24 hours of collection;
- explicit prohibition on the use of drones to conduct surveillance of First Amendment-protected activities (religious activities, protests, political gatherings etc.).

EU policymakers will doubtless protest that such regulations are beyond their mandate and powers and as such can only be dealt with by the member states. This is an unacceptable abdication of responsibility: if it is to develop the regulatory environment and fund the technology that makes possible the widespread flight of drones in Europe’s skies, the EU must develop model laws and principles to protect fundamental rights and restore public confidence. Vague commitments to “privacy by design” and “data protection” are no substitute for proper regulation. The idea that such commitments will somehow allay deep-seated public fears is laughable.

Working Group 3 of the European Commission’s *ad hoc* RPAS Steering Group is tasked with devising “measures to increase public acceptance” of drones but, as noted in chapter 2, their work appears to be predicated on manufacturing consent rather than protecting fundamental rights. A credible approach to technology development that respects civil liberties can only come from the full participation in the RPAS Steering Group of members of the European Parliament’s LIBE Committee, the EU Fundamental Rights Agency and the European Data Protection Supervisor, with meaningful public and civil society consultation.

Instead of trying to condition society to accept drones – a ridiculous initiative that is doomed to fail – European Commission regulators should be striving to ensure that the deployment of drones is only ever done in a socially responsible way. This could include ensuring that the use of drones to search for migrants and refugees in the Mediterranean, for example, is only permitted as part of a credible search-and-rescue policy (and not geared toward the prevention of access to EU territory and the denial of access to Europe’s asylum system).

7.5. Prevent drone wars, proliferation and the degradation of international law

Although the EU is focussed on modifying military drones for security and other “civilian” tasks, it is *de facto* subsidising the participation of European defence conglomerates in the race to develop and supply the world with the combat drones of the future. The USA and Israel are already supplying their allies with military drones; China and Russia harbour the same ambitions; European arms companies are desperate to compete. The genie is already out of the bottle in terms of the global drone race but history will judge the EU according to the role it played in respect to both proliferation and deployment. There are at three crucial areas in which the EU could play a leading role in mitigating the worst effects.

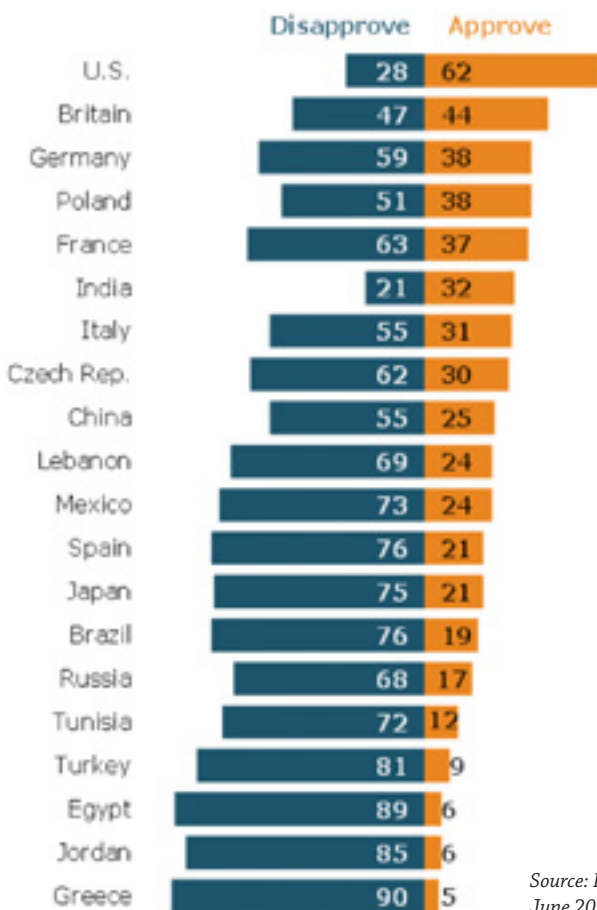
The first and most urgent is the defence of international law. Despite the torturous argument of lawyers for the Bush and Obama administrations, the USA’s targeted assassination programme is a flagrant breach of international human rights law and the rules governing armed conflict and the protection of civilians. It is painfully obvious that the longer the world remains silent as the US government continues to kill people with missiles launched from drones in the name of “counter-terrorism”, the more difficult this precedent will be to reverse.

The EU is founded on the principle of respecting and developing international law, particularly the principles of the United Nations Charter. This is a supposed to be a binding obligation, not some optional extra reserved for governments not currently in favour. EU governments should consider the wishes of their people and lead by example in acknowledging and condemning extrajudicial executions for what they are. Silence in the face of the US’ actions can only be interpreted as acquiescence; when other states start emulating US drone strikes there will be no moral high ground left to occupy.

A second action that would demonstrate global leadership would be to stop subsidising the UAV programmes of the EU’s (and Israel’s) combat drone manufacturers. Despite the torturous lengths that EU policymakers go to present these subsidies as having a “solely civilian focus”, it is incredulous to argue that this is anything other than state aid for the defence sector when these companies are effectively being funded to adapt their wares for security missions and put them in the shop window. In funding every aspect of drone development except weaponisation, the EU is at the forefront of the global drone race. This can only encourage other states to enter.

Given these concerns, the third area in which the EU could act is export controls. Fears about the proliferation of UAV technologies to repressive regimes, non-state actors and even terrorist groups will doubtless become a major issue in coming years. Current existing export control regimes have the potential to control UAV technology but are limited by both the number of participating states and the non-legally binding nature of the agreements. To ensure that transfer of UAV export technology will be properly assessed against human rights principles and other criteria in the European Code of Conduct on Arms exports, the European Union should initiate discussions in the framework existing export control regimes and invite non-member States to become part of the Wassenaar Arrangement and the Missile Technology Control regime. The EU should also work with partners on the inclusion of UAV and related technology in the 2012 Arms Trade Treaty which could enter into force in 2014 if 50 states ratify it.

Widespread Opposition to Drone Strikes



Source: Pew Research Center, ‘Global opinion of Obama slips, international policies faulted’, June 2012

7.6. Prohibit the development of fully autonomous drones

In April 2013 a coalition of NGOs launched the Campaign to Stop Killer Robots, calling for a “pre-emptive and comprehensive ban on the development, production, and use of fully autonomous weapons”, an international treaty, national laws and other measures. “Killer robots” include all computer-directed weapons systems that once launched can identify targets and attack them without further human involvement.



There are as yet no autonomous killer drones – but as more and more automated flight and targeting applications are devised, the more likely it is that they will be introduced in the future. In May 2013 the United Nations Human Rights Council debated the issue for the first time, following the presentation of the report on “lethal autonomous robotic weapons” by the UN Special Rapporteur on extrajudicial executions.³⁸³ Two dozen states expressed interest and concern in the challenges posed by fully autonomous weapons. Only the United Kingdom declared its opposition to the call for a moratorium or a ban on fully autonomous weapons.³⁸⁴

Looking at the EU treaties and the specific rules on dual-use research it appears inconceivable that EU could be funding research into fully autonomous drones or autonomous weapons systems. The problem facing advocates of the ban on killer robots, however, is that many of the applications needed to develop them are generic or “interoperable” – they have multiple uses in multiple devices. The communications and GPS systems, artificial intelligence, autonomous movement, tracking and targeting capabilities, payloads etc. are all being developed for other purposes, most of them benign. The R&D that underpins the emergence of killer robots is already effectively spread across hundreds of companies and hundreds and products the world over.

Given the militarised nature of EU R&D funding for drone projects, European tax revenues may already have inadvertently funded the systems that will be used by the autonomous killing machines of the future or the companies that will produce them – or both. While this underscores the need for much greater scrutiny and democratic control of EU research funding, it also gets to the heart of why an international treaty is so important – and why the EU has an obligation to play a leading role in developing one.

383 Christof Heyns, ‘Report of the Special Rapporteur on extrajudicial, summary or arbitrary executions’, 9 April 2013, http://www.statewatch.org/observatories_files/drones/eu-un-2013-autonomous-weapons-report.pdf

384 ‘Consensus killer robots must be addressed’, *Campaign to Stop Killer Robots*, 28 May 2013, <http://www.stopkillerrobots.org/2013/05/nations-to-debate-killer-robots-at-un/>

List of acronyms

ASBU	Aviation System Block Upgrades
ASD Europe	European Aerospace and Defence Manufacturers Association
ASV	Autonomous Surface Vehicle
ATM	Air Traffic Management
AUV	Automated Underwater Vehicle
BLOS	Beyond Line-of-Sight
BVLOS	Beyond Visual Line-of-Sight
C2	Command and Control
CAA	Civil Aviation Authority
CGArm	<i>Conseil Général de l'Armement</i>
CONOPS	Concept of Operations
CORDIS	Community Research and Development Information Service
CFSP	Common Foreign and Security Policy
CSDP	Common Security and Defence Policy
DG	Directorate General
DG ENTR	Directorate General Enterprise and Industry
EASA	European Aviation Safety Agency
EC	European Commission
EDA	European Defence Agency
ENTR	Commission Directorate General Enterprise and Industry
EREA	Association of European Research Establishments in Aeronautics
ERSG	European Remotely Piloted Aerial Systems Steering Group
ESA	European Space Agency
ESP	European Space Policy
ESPI	European Space Policy Institute
ESRAB	European Security Research Advisory Board
ESRIF	European Security Research and Innovation Forum
EUROCAE	European Organisation for Civil Aviation Equipment
EUROCONTROL	European Organisation for the Safety of Air Navigation
EUROSUR	European Border Surveillance System
FAA	Federal Aviation Authority
FP	Framework Programme
GoP	Group of Personalities
HALE	High Altitude Long Endurance
HLG	High Level Group
IAI	Israel Aerospace Industries
ICAO	International Civil Aviation Organisation
ICB	European UAV Industry Consultation Body
IES	Institute for Environment and Sustainability
IPSC	Institute for the Protection and Security of the Citizen
ISR	Intelligence, Surveillance and Reconnaissance
JAA	Joint Aviation Authorities of Europe
JRC	Joint Research Centre
LOS	Line-of-sight
MALE	Medium Altitude Long Endurance
MEP	Member of the European Parliament
NATO	North Atlantic Treaty Organisation
OPA	Optionally-Piloted Aircraft
PASR	Preparatory Action for Security Research
RPAS	Remotely Piloted Aerial System
R&D	Research and development
SAG	Security Advisory Group
SES	Single European Sky
SESAR	Single European Sky Air Traffic Management Research
SESAR JU/SJU	Single European Sky Air Traffic Management Research Joint Undertaking
SIVE	<i>Sistema Integrado de Vigilancia Exterior</i>
STAR 21	Strategic Aerospace Review for the 21st Century
SWIM	System Wide Information Management
UAS	Unmanned Aerial System
UASSG	Unmanned Aerial Systems Study Group
UASWG	Unmanned Aerial Systems Working Group
UAV	Unmanned Aerial Vehicle
UCAV	Unmanned Combat Aerial Vehicle
UMS	Unmanned Maritime System
UUV	Unmanned Underwater Vehicle
UVSI	Unmanned Vehicle Systems International
VLOS	Visual Line-of-Sight
WEAO	Western European Armaments Organisation

About the authors

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Founded in 1974, the Transnational Institute (TNI) is an international network of activist-scholars committed to critical analyses of the global problems of today and tomorrow. We seek to provide intellectual support to those movements concerned to steer the world in a democratic, equitable and environmentally sustainable direction. For more information see www.tni.org

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