

National Security

When Time is of the Essence

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Abstract

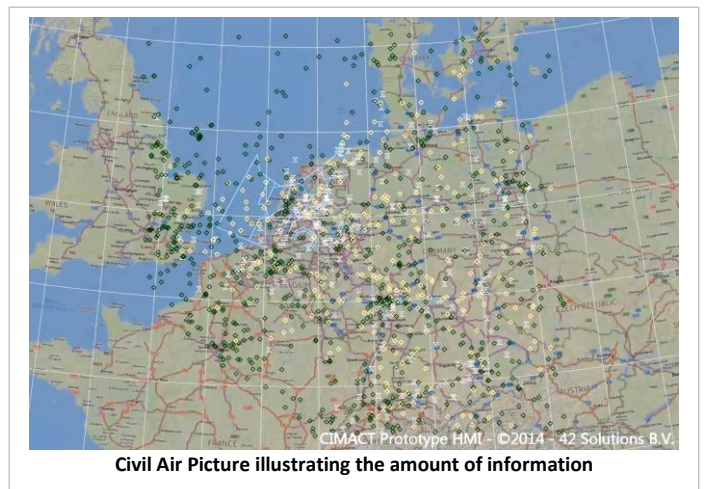
Civil ATCOs play a crucial role in supporting national security. Breaches in national security require a decisive and timely response. A prerequisite to detecting these breaches is the dissemination of information from civil to military authorities. However, the sheer amount of information and the primary focus on safety creates a whole new area of blind spots.

Automated security nets and incident management systems are needed to illuminate these spots and allow the proper authorities to focus the attention on the actual anomalies and to coordinate the proper responses.

ATCO support to National Security

Civil-Military Coordination is often viewed from an Airspace Management perspective. The ownership and use of airspace is coordinated between two distinct user groups. However, the cooperation between the Civil and Military bodies extends to a wide variety of areas beyond Airspace Management. Quite frequently, civil ATCOs play a crucial role in supporting national security.

Safeguarding national security is a complex process mainly because of the overwhelming amount of information on actual civil flight movements. It is important for air defence to establish if a flight is 'cooperative'. In other words, is the flight complying with the standing rules and regulations, the approved flight plan/profile, etc. Detection of a non-cooperative flight would render it 'suspect'. What follows is an in-depth assessment of the probable cause(s) and risks in order to initiate appropriate measures.



Unfortunately, to detect if a flight is cooperative, air defence requires knowledge about the active instructions issued by the civil ATCO. Such information is disseminated to a certain extent (e.g. by means of flight plan distribution) but often lacks real-time amendments.

Even with full access to complete flight profile information, scrutinising the air situation in search of non-cooperative flights would be a tremendous activity that largely copies the role which the civil ATCO is already fulfilling. Consequently, civil ATCOs play a crucial role in detecting anomalous behaviour. It is the ATCO who is most likely to be the first to detect anomalies, to investigate these and to alert the appropriate partners where needed. Thus handing over responsibility to the national security domain.

Indicators show that air traffic has shown a fairly constant growth over the past decade. The ever increasing amount of traffic implies that ANSPs and ATCOs face the challenge of coping with the increase. At the same time they are challenged to improve performance, reduce cost and ensure safety. The ATCO's extracurricular responsibility of supporting national security conflicts with this challenge.

To deal with the increasing amount of information, the ATCO has to compartmentalise and focus on the responsibility of ensuring safety (not security). This implies that anomalies that are not, or at least not evidently, undermining safety, can easily slip the ATCO's attention.

The recent MH370 incident and the 9/11 attacks illustrate how factual above challenges are. As the MH370 flight incident shows, compartmentalising responsibilities, though effective in terms of safety critical decision making, implicitly creates blind spots with regards to accidental or intentional non-cooperativeness. The reports on the 9/11 attack show that although the anomalies were detected at an early stage, interpretation and consequential reporting to NORAD took quite some time [1]. In both scenarios, ATCO awareness, alertness and promptness play a crucial latent security role in a safety mind-set.

Note that above statement is based on the assumption that losing coverage of MH370 could have been regarded an anomaly. ICAO, CANSO and IATA are investigating the possibility to establish global tracking capabilities to eliminate such coverage gaps. Still, from the ATCO perspective the MH370 was safely handed over to Ho Chi Minh [2] so a loss of coverage in Malaysian airspace would no longer have been 'of interest' to the ATCO.

Introducing security nets

Most ANSPs provide ample mechanisms to automatically flag safety critical situations that require immediate ATCO attention (safety nets) [3]. Similarly, military centres which monitor air traffic from a security point of view, could introduce mechanism to flag anomalies that require the attention of air defence, or even rescue coordination centres.

The concept of security nets caters for supporting the military controllers with the detection of these anomalies. Thus limiting the active monitoring requirement to the set of flights that are 'suspect'.

The types of anomalies and the required response, are diverse. In general, the security nets should trigger any 'breach of contract' between the ATCO and a pilot. This could be based on

any information that can be derived automatically like deviation from the agreed flight profile (route, cleared flight level, ETO), unexpected transponder changes, transponder loss, or even a lack of voice communication (although this would require a special infrastructure). Of course, it could also cater for detection of security breaches (spoofing). Automatic detection can expedite a scramble of Quick Reaction Alert interceptors, or a swift SAR operation.

In the MH370 scenario, security nets could have resulted in an instant alert based on a loss of coverage (transponder loss) which could have led to an instantaneous response.

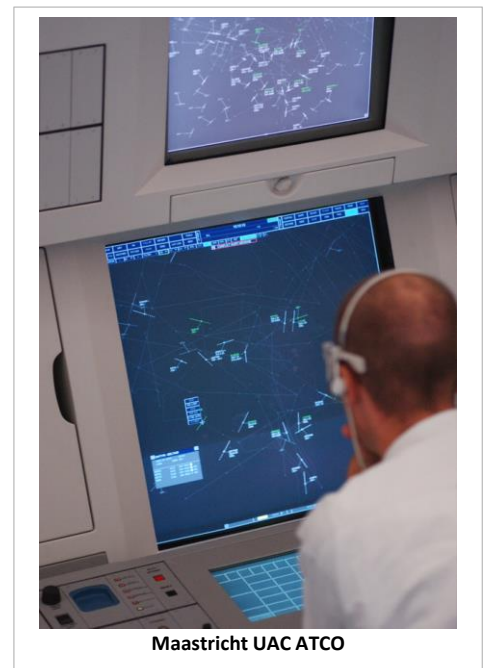
The need for information

A prerequisite for such a security net mechanism is voluntary information dissemination from civil centres to the military domain. The embellishment 'voluntary' is not superfluous as sharing information on ATCO decisions requires bilateral agreement to avoid the impression of having a big brother watching ATCO activities, but such data dissemination is not unheard of.

Civil-Military Coordination in Germany has been listed as an exemplary case in terms of flexible use of airspace [4]. But the German Air Force also has an impressive record of sound coordination with the civil ANSPs in terms of air defence activities going back as far as 1979. At that time, EUROCONTROL Upper Area Control centres in Maastricht and Karlsruhe provided real time information to the military domain (CRCs), thus improving the actual situational awareness and limiting the coordination effort by effectively bringing the real time civil ATC picture to the Air Defence sites.

In 2003 EUROCONTROL took the initiative to equip the CDCs of the French Air Force with a ported variant (now called CIMACT) of the German system to further improve Civil-Military Coordination in cross border areas. Both systems showed real-time flight plan and track details containing most of the essential ATCO inputs [a].

In the pre-9/11 world, the above examples of presenting the civil air picture to the military controller sufficed. It enabled the air defence operators to identify air traffic as 'known and under civil control' which rendered it 'friendly' (non-threatening). This, sadly, has proven to be a flawed assumption (though, in terms of pure Civil-Military separation coordination it still suffices). As the 9/11 attacks have demonstrated, any flight, at any time, in or near sovereign airspace could become suspect.



Introducing Incident Coordination

In 2006 the interoperability and adaptability of CIMA CT was recognised by the NATO as a viable basis for the implementation of the NATO-Russia Council's Cooperative Airspace Initiative. This initiative, conceived in the wake of the 9/11 attacks, focussed on *"providing increased transparency, early notification of suspicious air activities, rapid coordination and joint responses to security incidents in the European airspace, including terrorists threats."* [5].

This next evolutionary step added the concept of cross-border (multi-state), cross-domain (civil-military as well as military-military) coordination to the equation. Within the CAI initiative this multi-state approach has been demonstrated and validated in several live "Vigilant Skies" events. The system allowed operators in different countries to easily exchange information and co-ordinate responses, thus adding an incident management capability to the CIMA CT platform.



It is interesting to observe that the 9/11 attack response was hampered by the fact that *"NEADS did not know where to send the alert fighter aircraft"* [1]. The incident management capability caters for this particular real-time relay of information.

Still, as stated previously, enabling coordination and information sharing might just add to the workload. A more active approach seemed required and since actively monitoring all flights in sovereign air space is a near to impossible task, a solution was sought in establishing security nets.

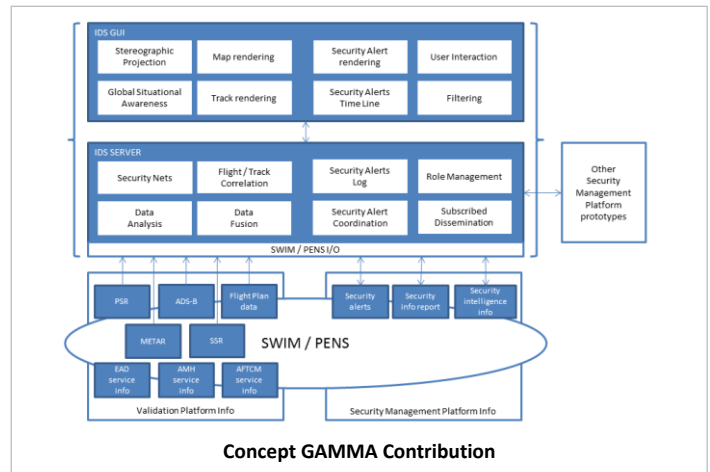
It was in this context that a first security net concept was demonstrated to the CAI Programme Manager within NATO. This demonstration, however, could offer tangible results only because of the presence of regularly updated information which included sufficient flight profile information that could be monitored (current flight plan, cleared flight levels, present/next SSR etc.). Obtaining this information is where today's challenges lie.

The Next Step

Today's ANSP systems are 'closed' and do not readily offer this information to the extent needed. Of course, interoperability regulation ensures that a certain inter-centre level of information is available but access to intra-centre information is not readily disseminated. It often takes special legacy interfaces to extract actual flight profile information as defined by the ATCO that is currently controlling the flight from today's ANSP systems.

Within the scope of SESAR IOP-G groundwork is laid for harmonising such information streams by disclosing real-time 4D trajectory info (Flight Objects) in a networked environment (SWIM/PENS). By giving the military access to this environment the possibility arises to fully transfer the responsibility of security related activities to the military domain [6].

The Global ATM Security Management Project funded by the EU might offer the means to further develop above security nets and establish real-time information gathering by liaising with the SESAR IOP-G workgroups. Within the GAMMA scope, the incident management capabilities will be expanded even further, bridging the information sharing gap between air defence organisations and ANSPs [b]. Additional security nets can expedite responses and reduce the dependency on civil ATCO vigilance.



Author's Note

This article is not meant as a scientific paper but is meant to be informational and expresses the authors viewpoint on the topic. The author aims to establish wider awareness and promote a common agreement on broadening ways for multi-stakeholder cooperation to support national security organisations in coping with their challenges.

The author has been working in the area of Civil-Military Cooperation since 1994 starting with ADMAR 2000. As a founding partner of 42 Solutions, a Dutch IT solution provider, he and co-founder Bert Brouwer have supported and worked on several European initiatives in the scope of security. Their work on CIMA CT formed the foundation of what later became the CAI system. 42 Solutions endeavours to continue their work on the development of incident management and security net capabilities within the scope of GAMMA. They have developed a wide-area situational display which allows for global coordination.

References

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[a] <https://www.eurocontrol.int/services/civil-military-atm-co-ordination-tool-cimact>

[b] <http://www.gamma-project.eu/>