Multinational Multi Role Tanker Transport Unit and European Air Transport Command - A Two-Year European Collaboration in the Field of Strategic Aeromedical Evacuation

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Abstract

Introduction: The Multinational Multi Role Tanker Transport (MRTT) Unit (MMU) consists of nine A330 MRTT aircraft based in Eindhoven and Cologne. One is utilised as an aeromedical evacuation (AE) asset on a 24-hour notice-to-move standby. Six European partners participate in the unit. The European Air Transport Command (EATC) is an integrated command of seven nations and among its core capabilities is strategic AE.

Material and methods: The new collaboration between the two multinational entities was analysed based on the number and characteristics of patients and executed missions from July 2023 to July 2025.

Results: Thirty-five patients were transported in 21 missions. Twenty-six of them were from Germany. Neither death nor disease contagion was reported during these AE missions. Priority 3 cases were 23, the 12 remaining were classified as Priority 2. Dependency 2 was stated in 14 cases. Niger (14) was the most important country of origin. Patients' diseases included, among others, rectal bleeding, long QT syndrome, intracranial aneurysm and traumatological cases.

Conclusions: Cooperation between EATC and MMU poses challenges in a multinational environment. With several patients transferred, it has proven to be a safe and effective means of transportation. However, there is still room for improvement regarding standardisation and smoothening procedures.

Keywords: aviation medicine; infection control

Introduction

Eight European partners (Belgium, the Czech Republic, Denmark, Germany, Luxembourg, the Netherlands, Norway and Sweden) participate in the Multinational Multi Role Tanker Transport (MRTT) Unit (MMU), rendering it one of the first multinational air transport wings in Europe. Established in July 2019, it consists of nine A330 MRTT aircraft, the first of which was delivered in July 2020.[1] With a total length of 58.8 metres, its range exceeds 13 000 km, allowing it to evacuate patients from outside the European continent without refuelling. One of them is utilised as an aeromedical evacuation (AE) asset on a 24-hour notice-to-move (NTM) standby (Figures 1 and 2). AE of combat casualties has played a central role in military history since its introduction during the First World War.[2,3] The A330 MRTT is ready to transport 86 patients, including six ICU individuals. The aircraft is registered in the Netherlands, the AE crew members (AECMs) are German, and it is based in Cologne. On board, there can be a maximum of 24 AECMs. The minimum crew consists of one NCO as the Medical Crew Chief, one anaesthesia nurse, one medical technician and two doctors: the Medical Director and one anaesthesiologist. Cooperation with the European Air Transport Command (EATC) in the field of AE began in July 2023.

Figure 1. Interior of the Multi Role Tanker Transport Unit 330 with the aeromedical configuration.

Figure 2. External view of the Multi Role Tanker transport MRTT 330.

The Netherlands, Belgium, Germany and France inaugurated the EATC on 1 July 2010. Luxembourg followed in 2012, and Spain and Italy applied to participate 2 years later. These seven Participating Nations (PNs) operate their portfolio of over 180 assets, located at various national air bases, in this single command entity, with a standard set of rules and regulations under the motto 'Pooling and sharing'. EATC's air mobility includes passenger and cargo transport, air-to-air refuelling and AE. The main goal is to enhance the efficiency and effectiveness of the PNs' military air transport efforts through cooperation and coordination, thereby facilitating the exchange of information and experience, as well as training in a multinational environment. The relationship is based on an innovative and flexible business model in which nations transfer authority over designated assets to EATC, which manages the fleet under its operational control to perform the requested air transport services. The exchange of services is based on the 'Equivalent Flying Hour': this is the cost of one C-130 flying hour. The price of all other aircraft types offered is calculated against this C-130 reference. This cashless arrangement facilitates mutual support through the exchange of services and serves as the currency among the PNs.

Three divisions support the EATC's command group.[4] Under the Operational Division, AE Control Centre (AECC) plans, coordinates and controls cost-effective strategic AE (Strat AE) in close cooperation with other relevant EATC branches and national authorities. AECC receives the Patient Movement Request (PMR) from the PNs, a document that triggers the process of AE. It is based on NATO STANAG 3204, which gives medical personnel, who are responsible for coordinating the patient evacuation, an easy yet concise way to assess the urgency of medical treatment (Priority [P]), medical support needs during transport (Dependency [D]), and transport modality (Classification [C]) of each patient.[5] AECC evaluates the PMR, selects the most suitable transportation asset for the patient, plans the mission and supervises every step until its successful completion, in close cooperation with the national authorities. The individuals can be transferred as an addition to planned missions or, if needed, on a dedicated asset, which means the mission is created for the patient. Several options are available: Luxembourg Air Rescue is a civilian enterprise with a fleet of five aircraft with an NTM of 2 hours. A German A400M in Wunstorf, with an NTM of 12 hours, and the A330 MRTT complete the options of dedicated assets. The three of them are on a permanent 24/7 alert.

Material and methods

The new collaboration between the two multinational entities in the field of Strat AE and its impact on current procedures was analysed based on the number and characteristics of patients and executed missions from 27 July 2023 until 21 July 2025. In all cases, the aircraft used was the Strat AE version of the Airbus A330 MRTT based in Cologne. The equipment includes standardised Patient Transport Unit Next Generation modules suitable for the latest ventilators. Laboratory testing, monitoring systems and ultrasound capabilities are also available for on-board use.

Table 1. Principal features of the 21 missions performed

	APOE	Diagnosis	PDC (STANAG 3204)	Flight time (h)
1	Niamey	Pneumothorax	P2 D2 2A	5:20
2	Niamey	Acute colitis & gastritis	P3 D4 3B P2 D3 2B	5:30
3	Bamako	Malaria	P2 D2 2B	6:10
4	Bergen	Weber B #, Long QT Syndrome	P3 D2 3A	1:45
5	Seville Rzeszow	Syncope Fx clavicle, sprained ankle Ileum carcinoma (post-surgery) Kidney stones	P3 D2 4 P3 D3 3B P3 D2 3B P3 D4 4	3:40
6	Paphos	Skull fx/primary unconsciousness	P3 D2 2B	4:00
7	Izmir	Cerebral apoplexy	P2 D2 2A	2:30
8	Dakar	Disc prolapse, spinal cord compression	P2 D3 3B	5:45
9	Amman	ICB due to ruptured aneurysm	P3 D2 2B	5:30
10	Kinshasa	Kidney stones	P2 D2 2B	9:10
11	Niamey	Kidney stones & hydronephrosis	P2 D3 2B	5:40
12	Porto	Syncope	P2 D2 2B	3:25
13	Larnaca	Haemorrhagic ovarian cyst	P2 D3 3A	4:20
14	Niamey	War injuries (10 patients)	P3 D3	7:00
15	Honolulu	Infarction	P3 D3 3A	17:55
16	Poznan	Costal cartilage fx	P2 D2 2B	1:45
17	London	Syncope and cardiac arrest	P3 D1 2A	3:30
18	Tucson	Spine fx	P3 D2 2B	10:30
19	Kaunas	Psychological impairment	P2 D3 1B	2:00
20	Haarstad	Acute appendicitis	P3 D2 2B	2:45
21	Bodø	Hip pain Broken tooth	P2 D2 2A P3 D4 3B	3:20

APOE: airport of embarking. Fx: fracture. P: Priority (P1: Urgent; P2: Priority; P3: Routine). D: Dependency (D1: High; D2: Medium; D3: Low; D4: Minimal). C: Classification (1A: Severe psychiatric patients; 1B: Intermediate severity psychiatric patients; 1C: Mild psychiatric patients; 2A: Immobile stretcher patients; 2B: Mobile stretcher patients; 3A: Sitting patients able to escape; 3B: Sitting patients unable to escape; 4: Walking patients).

Results

Thirty-five military patients were evacuated in 21 missions. Twenty-six of them were from Germany, eight from the Netherlands and one from Belgium. The three countries are PNs of both EATC and MMU. The first two missions departed from Niamey (Niger) (Table 1). The diagnosis of the first case was pneumothorax. The second case occurred in August 2023 and was upgraded to a P2 Priority after the patient worsened from the initial acute colitis. The third individual was also stated as P2 due to a malaria infection. The first time the A330 MRTT flew to pick up a patient in a European country was 2 October 2023, to transfer a patient with a long QT syndrome from Bergen (Norway). Shortly after, a mission with two legs was created to transport 4 P3 subjects from Seville (Spain) and Rzeszow (Poland) with war injuries. Finally, the largest number of subjects transported was 10. The mission took place 18 September 2024 and departed from Niamey. All the patients were classified as P3.

The most repeated diagnosis was kidney stones, with three patients transported. Other cases included cardiac arrest, rectal bleeding, intracranial

aneurysm, cerebral apoplexy and haemorrhagic ovarian cyst.

Niger, with four missions, was the most important country of origin and the only one to be visited more than once. Thus, the 17 remaining missions served a different APOE on each occasion. Honolulu (Hawaii) was the longest mission in terms of distance.

No deaths or deterioration were reported during the AE performances. Twenty-three patients were classified as P3 (Routine), and 12 as P2 (Priority). Dependency was heterogeneous: 1 was D1 (High), 14 D2 (Medium), 16 D3 (Low), and 4 D4 (Minimal), while Classification varied from 1B (psychiatric patient of intermediate severity) to 4 (walking patients).

Discussion

We present the results of a new AE cooperation of two international entities that started in July 2023. Twenty-one missions have been conducted, evacuating 35 subjects, all of them military. Twenty-six patients were from Germany (74.2 %), which is likely related to the significant number of German troops deployed abroad. Moreover, it seems reasonable that Niger was the embarkation point for four missions, given the number of military personnel deployed there during this period.

Twelve of the patients were classified as P2 (34.3 %) and 23 as P3 (65.7 %). Given that the A330 MRTT has an NTM time of 24 hours, mainly due to ground travel time to Cologne for crew members on call distributed in Germany and the Netherlands, it is reserved for P2 individuals. For P1 subjects (NTM less than 12 hours), EATC uses the German A400M and LAR assets. However, in the event of a high-intensity conflict, special measures could be taken to reduce the NTM.

Dependency varied from medium (14 were D2) to minimal (D4). Classification was 3A (sitting patients unable to egress without support) in 11 cases (31.4 %) and 2B (mobile stretcher patients) in 10 cases (28.5 %), demonstrating that patients whose status can deteriorate during flight can also be transported safely using the A330 MRTT. The fact that, in one mission, 10 patients were evacuated simultaneously, and that the APOEs utilised included remote destinations such as Honolulu, accentuates this conclusion.

In a limited space, exposed to noise, acceleration forces, vibration and communication difficulties, among other things, the transport of complex patients is a real challenge.[6,7] It is due to the professionalism of AE medical crew that no case of deterioration or fatalities on board was documented.[8] A crucial factor for AE success is the constant update of patient status, always present in EATC/MMU procedures.

Challenges include the fast-paced patient dynamics and the management of flight duty regulations. Moreover, since the asset is Dutch, the medical crew is German, and the patient may be from a different nation, collaboration between MMU and EATC represents a test of, among other things, language barriers, multinational crew members and unstandardised medical equipment. It has proven to be a safe and effective means of transportation, especially given that pathologies spanned various specialties and the missions took place from 18 different APOEs. However, there is still room for improvement in harmonising and smoothening procedures. Furthermore, this underscores the importance of making military and civilian medical structures work together more frequently, as the likelihood of sharing future complex scenarios is real,[9] and where conflict of ethics could arise[10].

In conclusion, we present data on 35 repatriated cases from 21 missions conducted from July 2023 to July 2025. Despite its complexity, especially when different nations are involved, no case of deterioration or death of a patient was reported.

Competing interest statement

The authors declare no competing interest.

Ethical statement

Our institution does not require ethical approval for reporting individual cases or case series.

Disclaimer

The views presented in the article are those of the authors and do not reflect the official position of EATC.

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