

2017


annual REPORT

Joint Air Power Competence Centre

www.japcc.org



**Joint Air Power
Competence Centre**

Cover picture:  Lockheed Martin, Darin Russell

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Release

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foreword

2017 has provided fresh insight into what the JAPCC can offer to the Alliance, and it has been eye-opening. The quality of personnel contributed by our Sponsoring Nations is superb and the scope of effective solutions offered by this organization has been outstanding. We are extremely fortunate to have such a centre of excellence available to assess and address the challenges facing our Alliance.

Today, we are confronted with myriad issues originating from every direction, including from within, that threaten the security of member nations. However, NATO is the most successful Alliance in modern history and has repeatedly shown its resilience over the last 68 years. While NATO has steadily adapted its approaches and structures to meet the demands of an evolving security environment, that environment is once again becoming more contested and a new strategic shift from assurance to deterrence is imperative.

It is in this context that the JAPCC has stepped into the gap to provide assistance across a wide range of Air and Space Power challenges. The JAPCC acts as a catalyst for the improvement of NATO's Air and Space Power by providing insightful ideas and effective solutions to the Alliance.

For example, while it is important that Allies invest more in defence, it is also paramount that we invest efficiently in the right capabilities. The JAPCC has performed an important role in identifying capabilities the Alliance needs and by facilitating national, multi-national and collective capability development and innovation for the improvement of Joint Air and Space Power. These efforts, reflected in this annual report, influence various Bi-Strategic Command investment decisions and we are confident you will recognize the broad impact of our efforts.

The JAPCC's efforts to train and educate the Alliance are paying big dividends, as well. Our specialists' involvement in multiple Command-level exercises have enabled them to supply unique insight and expertise in a rapidly changing landscape of scenarios. The

touch-points and influence of these accomplished subject matter experts are increasing at a tremendous rate, subsequently enabling a more skilled, effective fighting force that is able to execute and command and control operations in multiple domains.

The JAPCC is on the cutting edge of significant technology issues facing NATO, demonstrated by the Project Air Warfare in a Communications Networked Environment, which is proving to be a foundational work for future integration and command and control of legacy and 5th Generation systems, and the project NATO Joint Air Power and Offensive Cyber Operations, which looks at how NATO might leverage national capabilities to reinforce defensive Alliance measures. In addition, JAPCC led a SACT-sponsored study of shortfalls in NATO air and space capabilities and published the findings and recommendations under the title Joint Air Power Following the 2016 Warsaw Summit: Urgent Priorities. This important document identifies many low-cost and rapidly achievable solutions needed to ensure NATO air forces can continue to execute the Alliance's three core tasks – collective defence, crisis management, and cooperative security.

In many ways we, as the Alliance, are in an enviable position with exceptionally trained and motivated Airmen and a strong reputation for readiness and resilience. We at the JAPCC are proud of the significant role we play in making this possible.

JAPCC's Programme of Work continues to guide our efforts, which we are confident will continue to help Allied joint air forces adapt to our evolving environment. Over the following pages, this 2017 JAPCC Annual Report will highlight the key developments, projects and research shaping joint Air and Space Power. I encourage each of you to take a few short minutes to review this document, and to contact us with questions, feedback or requests for support at any time. Good Reading!



Tod D. Wolters

General, USA AF
Director, JAPCC

who we are

Established in 2005, the JAPCC was the first NATO-accredited Centre of Excellence (CoE). We provide subject matter expertise across a broad range of Joint Air & Space (A&S) Power topics including the development of Concepts and Doctrine, Capability Development, Education and Training, and Lessons Learned in accordance with NATO MC (M) 236.

The JAPCC seeks to maximize its contribution to the improvement and transformation of Joint A&S Power through a well-formulated engagement strategy. This strategy not only guides the Centre's approach to organizations within NATO and our Sponsoring Nations, but also enables outreach to other national organizations and academia, allowing the CoE to tap into a comprehensive and diverse pool of Joint A&S Power subject matter experts

Director's Vision

To be NATO's catalyst for the improvement and transformation of Joint A&S Power, delivering effective solutions through independent thought and analysis.

Mission

The JAPCC, as a team of multinational experts, is to provide key decision-makers effective solutions on A&S Power challenges, in order to safeguard NATO and the Nations' interests.

Leadership

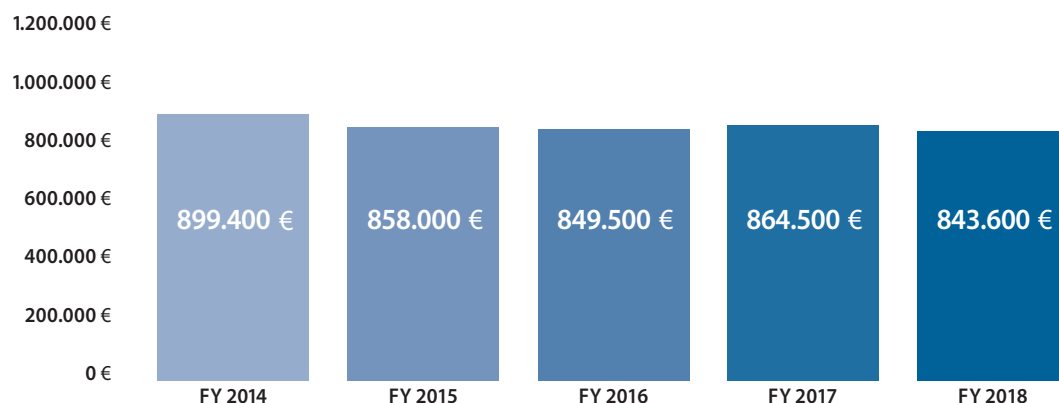
The JAPCC is headed by the Director, General Tod D. Wolters (USA AF), who has led the centre since August of 2016. General Wolters also serves as the Commander, Allied Air Command and the Commander, United States Air Forces in Europe and Air Forces in Africa (USAFE-AFAFRICA) at Ramstein Air Base. The JAPCC's Executive Director, Lieutenant General Joachim Wundrak (DEU AF), also commands the German Air Operations Command and the German Joint Force Air Component.



Director (USA AF)
General Tod D. Wolters



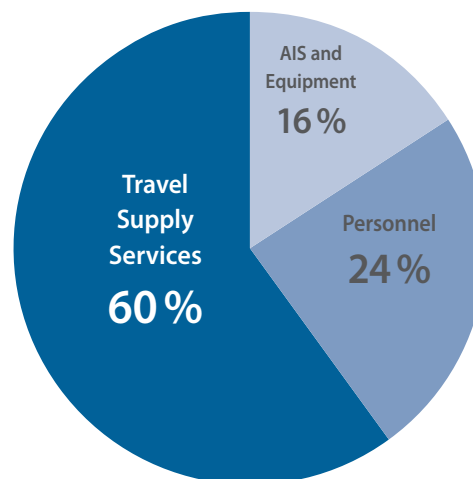
Executive Director (DEU AF)
Lieutenant General Joachim Wundrak



Approved JAPCC Budgets

On site, Air Commodore Madelein M.C. Spit (NLD AF) serves as the Assistant Director (AD), and together with the Chief of Staff, Colonel Brad Bredenkamp (USA AF), provides day-to-day leadership for the JAPCC team.

Colonel Norbert Geißendörfer (DEU AF) is Branch Head, Assessment, Coordination and Engagement (ACE) and Colonel Joseph Speed (USA AF) is Branch Head Combat Air (CA). Colonel Marco Galgani (ITA AF) is the Branch Head C4ISR+S as of 1 November 2017. Colonel Lambertus van Daatselaar (NLD AF) is the Branch Head AOS.



JAPCC Budget Spending in FY 2017



Assistant Director (NLD AF)
Air Commodore Madelein M.C. Spit



Chief of Staff (USA AF)
Colonel Brad A. Bredenkamp

Personnel

The JAPCC has lost capability and capacity due to decreasing manpower over the past years. This trend continued in 2017, with JAPCC ending the year with an overall manning of 63 percent. As of 31 December, the JAPCC had only 33 of 58 Subject Matter Experts (SMEs) available (55 %) to address work in more than 30 separate subject matter areas.

The JAPCC continues to actively mitigate these shortfalls through cross-utilization, internal education and training as well as creative technological solutions. However, in order to better address the spectrum of air and space subject matter areas relevant to NATO, and to better support the Joint Warfare Centre and major NATO exercise programmes, JAPCC needs Sponsoring Nations to consider increasing their participation, and needs other NATO nations who may be benefitting from the Centre's work to consider joining.

Budgeting and Finance

Based on the JAPCC Medium Term Finance Plan and taking into account of the actual number of assigned staff officers, the JAPCC Budget for 2017 remained just below 900,000 Euros. Our Senior Resource Committee (SRC) continues to provide full support to our budget on the basis of 'minimum military-requirements'. As described in the JAPCC Operational Memorandum of Understanding, the sponsoring nations contribute to the budget according to the number of staff officers in their bid. The current corresponding annual cost per staff officer is approximately 15,170 Euros. For Fiscal Year 2017, the approved budget of 864,500 Euros was expended primarily on travel, supplies and services (60%), personnel related expenditures (24 %) and replacement of furniture, as well as hard- and software upgrades for automated information systems (16 %).

Stakeholders

Our primary customers are NATO Headquarters (Allied Command Operations, Allied Command Transformation, NATO Joint Commands and Air Command)

and sponsoring nations. However, the JAPCC also accepts Requests for Support (RfS) from other sources via our RfS form, which can be accessed through the JAPCC website. With numerous successful products and ever-increasing connections with industry and academia, the JAPCC continues to build upon its reputation as NATO's pre-eminent advocate for the development and enhancement of Joint Air and Space Power.



The JAPCC Provides Solutions to Address Air & Space Power Challenges

To fulfil our mission, the JAPCC conducts its own research and advocacy as well as responding to the needs of NATO and its member nations. Our Programme of Work (PoW) comprises Projects, Activities, and Tasks, which are dynamic in nature and are adjusted monthly based upon the acceptance of

Requests for Support (RfS). Independently, the JAPCC also hosts a number of major events, including an Annual Joint A&S Power Conference, the biannual meeting of the Air Operations Working Group (AOWG), the Maritime Air Coordination Conference (MACC), one session of the biannual meeting of Air-to-Air Refuelling WG, the JAPCC Steering Committee (SC) meeting and the Senior Resource Committee (SRC) meeting.



key developments

The JAPCC is vigorously active in areas in which it has Subject Matter Experts (SMEs) available to act. This section summarises the efforts the organization has made this year in support of NATO's Joint Air and Space Power; however, due to space constraints, these are top-level summaries of activity. For more detail on any specific area, please visit our website or contact us directly.

Joint Air Power Development

The JAPCC's support to Joint Air Power development in 2017 includes the following:

Joint Air Power Strategy (JAPS). One of the recommendations in the Joint Air Power Capability study (JAPC), completed in early 2016, was to develop a NATO Joint Air Power Strategy. This resulted in a tasker to both strategic commands, with ACT directed to lead the effort but with specific mention in the NAC tasker for inclusion of the JAPCC contribution. The development of a strategy was split in two periods. In the first period (until Nov 2016), the Ends and Ways were described, and a proposed definition of Joint Air Power was developed. In the second period (until end 2017), the Means of Joint Air Power were defined and the two developed

documents combined, resulting in NATO Joint Air Power Strategy. The Draft Strategy, was submitted to the NAC in November 2017. JAPCC provided key expertise and support with crafting of language throughout the three Joint Air Power Strategy workshops in 2017 as Phase 2 of the Strategy development. The focus of effort in 2017 was addressing the 16 DPCC (R) and MC comments from the Draft provided in Nov 2016 (Phase 1 of this effort) as well as developing a supporting list of required capabilities necessary to execute this Strategy. The final document was signed by the Bi-SC in October and is scheduled for NAC review in February 2018.

The Rotary Wing Focus Group. Rotary wing assets are widely used by all services among the Alliances' militaries and have always represented very critical capabilities in NATO-led operations. In order to best assess the current situation, recommend a way ahead, and monitor progress in the development of these capabilities, the JAPCC has established an internal working body called the Rotary Wing Focus Group (RWFG). The RWFG is to increase awareness and coordination among the assigned Rotary Wing Subject Matter Experts (SMEs) and their branch heads, in order to improve the quality of their work through a well-defined working method.



Today the RWFG counts five JAPCC SMEs with varying backgrounds from four different nations. They are spread over the Air Operation Support and Combat Air branches within the JAPCC. The RWFG also reaches out to other experts, either within the JAPCC or in Allied Air Command, Combined Air Operations Command Uedem or the German Air Operations Command Kalkar in order to support the development of specific projects or the organization of specific events. Due to the inherent process of consensus making, this working method significantly increases JAPCC credibility within the larger community of helicopter users.

Much as in the JAPCC itself, the projects and objectives managed by the RWFG range from the very tangible to the very conceptual. Examples of the former are the contribution to the development of ATP-49 'Use of Helicopters in Land Operations' and ATP-90 'Operational Competencies for Helicopter Crews in Support of NATO-led Land Operations and Exercises' within the Helicopter Inter Service Working Group (HISWG) and of a Helicopter Underslung Load compatibility matrix. Examples of the latter are the development of a white paper on the 'Future Battlefield Rotorcraft Capability' in parallel to the contribution to the NATO Army Armament Group/Joint Capability Group Vertical Lift/Next Generation Rotorcraft Capability Team of Experts of which the JAPCC has vice-chairmanship.

Support to the FP Section at NATO Air Command (AIRCOM) Headquarters. The JAPCC describes itself as 'NATO's Air and Space Warfare Centre' and as such, the NATO AIRCOM at Ramstein is both a major and priority 'customer'. The most recent major task, at the direct request of the Commander was to undertake a review of FP measures for Baltic Air Policing. This project explored the current position but, also addressed what measures would be necessary should the threat develop? The project was conducted in the Baltic Region with the full support of the nations involved. The output of the project is classified and has only been circulated to the three Baltic States and NATO AIRCOM. This project whilst officially concluded in June 2016, continues to attract attention and has led to a number of fundamental changes. An off-shoot of the project remains current with the JAPCC providing

direct support to Norway. The latest event was held at Oerland Air Base over the period 3–9 December 2017 and covered a number of areas to include, but not limited to, training serials, a review of plans and possible exercise support. This Objective demonstrates the JAPCC's ability to support both operational Alliance activity as well as individual nations.

Contribute Joint Air and Space expertise to Alliance decision-making processes through active leadership of, and participation in, NATO committees, Working Groups and fora.

Air Warfare Communication in a Networked Environment. The advent of technology which improves the method by which communication is achieved across the air domain offers an opportunity to shape the future of Air Command and Control. In July 2017, the JAPCC completed a detailed review of a future networked battlespace and the potential impact of near-unlimited communications on the disparate platforms which will operate in this environment.

Although 4th–5th Generation aircraft interoperability is currently a focal point of future battlespace considerations, this study is about much more than that. It explores a vision of the future communications networked battlespace and then identifies specific elements of coordination and communication necessary for operations in this type of hyper-connected environment. It is a conceptual review of a theoretical, but likely, future scenario that allows for dynamic integration of disparate platforms from the bottom-up (tactical) perspective.

Soon, clusters of different types of platforms will be allocated and combined to function as specific force packages, organized by capability and hierarchy, and ideally irrespective of service, country, or degree of human presence. Unlimited connectivity is no longer a thing of the future, yet combined decision-making and data-sharing (what we do with the information) are not evolving at the same speed as technology. As technology continues to develop and improve communication (speed and amount),



humans and artificial intelligence will have to develop new 'social contracts' in order to comply with and execute the Commander's intent.

The value in this study, and its subsequent relevance to NATO (both ACO and ACT), is to define air platform behaviour in this future networked environment to inform the development of both the network and command structures so that they may evolve in concert with the likely evolutionary behaviour of the assets over which they will exert control. Furthermore, the development of concepts such as Dynamic Airspace Synchronization, as well as the exploration of C2 adaptation, are designed with a more integrated, more joint and more connected battlespace envisioned than is currently executed today. The findings are

designed to address and improve the Commander's operational decision tempo in this future communications networked environment and will help shape the direction of research as both inter-operability in a joint (multi-domain) environment and communications amongst network participants improves.

Alliance Maritime Air Anti-Submarine Warfare; a Forecast for Maritime Air in the Future Operational Environment.

Although this study was published in 2016, the findings have resonated across the Alliance and generated multiple derivative work strands. JAPCC presented these findings at a Flag Officer Symposium hosted by COM Submarine Forces NATO in April 2017. Furthermore, NATO's Science and Technology Office (STO) published a classified white

paper which heavily cited this study's findings. The end result of these two efforts was new momentum from the ASG Defense Investment office in NATO HQ to develop a vision for future Alliance ASW. JAPCC served as a lead writer on the core team developing this paper. It is intended, upon NAC approval, that this vision paper be formally endorsed by ACT as a Concept which will then result in formal development of a multi-year get well plan.

Support to COE CSW Study on Integration of UAS into maritime operations. The JAPCC will support and co-author this COE CSW study which has been requested by MARCOM. Due to a lack of available expertise, this study request had already been passed from CJOS COE to COE CSW two years ago. As there is also little UAS expertise available within COE CSW, co-operation between JAPCC and COE CSW has been initiated this year in support of this project. The project's aim is to improve UAS integration into maritime operations with respect to Joint ISR, asset de-confliction, battlespace management, and maritime situational awareness.

Close Air Support Project. After the International Security Assistance Force (ISAF) and Operation Enduring Freedom (OEF) missions in Afghanistan many of the Tactics, Techniques, Procedures (TTP) and Lessons Learned/Lessons Identified (LL/LI) were driven by the scenario of a permissive air environment. As a result, NATO's Close Air Support (CAS) and Forward Air Control (FAC) capabilities have matured under these conditions. However, the operational environment is constantly shifting. This shift began with a hybrid-warfare paradigm and has evolved to a much more challenging, and far less permissive, Anti-Access/Area Denial environment; thus it is becoming apparent that new and complex problems of the operational theatre regarding CAS can only be solved by integrating LAND/MARITIME/SOF service visions with the Air Force. The aim of this project is to provide recommendations on how the CAS and Joint Terminal Attack Controller (JTAC) communities should adapt and leverage emerging capabilities to meet future operational requirements (using the SFA, FFAO and JAPS analyses as a baseline) in the long term (defined for this study as 10–15 years).

Joint Air Power following the 2016 Warsaw Summit – Urgent Priorities. At the 2016 Warsaw Summit, the Heads of State and Government (HOS/G) of NATO emphasised the need to address shortfalls in essential capabilities and competencies. Based on this strategic guidance, HQ SACT commissioned the JAPCC to conduct the 'Joint Air Power Following the 2016 Warsaw Summit – Urgent Priorities' study. The JAPCC's Executive Director led the project and Lieutenant General RNLAf (ret) Freek Meulman led a team of five external security, defence and joint air power experts with strategic political and military influence. The 6-part study identified 163 priorities NATO should address with regard to readiness, deployability and sustainability. Experts assigned urgency and cost levels to all priorities and listed 104 as needing the most urgent attention. Notably, less than nine of the most urgent are estimated to cost the Alliance more than \$10M. Seventy percent of the most urgent priorities have an estimated cost of less than \$1M. Some examples of these low-cost urgent priorities are pre-planning air-heavy deterrence options to incorporate into NATO plans, pre-authorizing overflight rights and developing multinational logistic responses to operational needs. The study featured prominently in the 2017 Joint Air Power Conference and has received attention from the highest levels. Lieutenant General Michael Hood, the Royal Canadian Air Force Commander noted, 'This paper provides an overdue and clear contemporary focus on NATO air power requirements. Although not representing NATO policy, the authors' perspectives cannot be overstated, if the Alliance is going to be capable of true deterrence and agile military response.' The study is of no classification and available for download from the JAPCC website.

Support of NATO STO study SCI-301 Defeat of Low Slow and Small (LSS) Air Threats. JAPCC is contributing in a 3-year study on the future Counter UAS systems which is headed by the NATO Science and Technology Office. While conventional threats remain of concern deployment of Unmanned Air Systems (UAS) has provided one of the most significant military capability enhancements of recent years. Challenges posed by UAS are many and range across the complete kill chain. Traditional systems and first-generation Counter UAS systems may be unable to cope with this challenge

in the future. The Goal of the study and its final report in 2020 will be recommendations to support a 'Second Generation' C-UAS networked system.

Support to the Multi-Domain Control System (MDCS) Working Group. The JAPCC has been requested to support this project with its operational expertise in the unmanned domain. The MDCS WG is a follow-on from the NIAG Study Group 202 on Development of a Conceptual Data Model for Multi-Domain Unmanned Platform Control System Services. The mission is to define a common framework architecture for unmanned platform control systems to facilitate system interoperability and reuse, portability, as well as scalability of software services, in support of National and NATO military missions. This standardized architecture will be documented in a STANAG and its associated Allied Publications. A corresponding standardization task and STANAG number assignment is currently in progress with the NATO Standardization Office (NSO).

Support to the ACT Autonomy Programme. Based on last year's JAPCC study on the legal implications of increasing automation, ACT requested our support in the area of unmanned system automation. The aim of the NATO Autonomy Programme is to gain an understanding of this emerging capability, identify the opportunities and challenges and to provide a coherent path for the Alliance to move forward with respect to autonomy. Specifically, the aim of the programme is to create a common understanding of what autonomy means for the Alliance, to identify challenges and opportunities for NATO, and to ensure coherence, harmonization and coordination of national efforts on autonomy.

NATO Air Level of Effort. In Political Guidance 2015 (PG15) NATO's 'level of ambition' (LOA) is expressed by using Expeditionary Air Force Elements (EAFE) as a capability to generate a number of 'sorties per day'. Although this metric is measurable and familiar to air planners, the main shortcoming in this method is that 'Sorties' are primarily (almost exclusively) used for measurement of fixed-wing air assets, and by definition it does not accurately capture nor reflect the other Joint Air Power (JAP) Capabilities. The NAC tasked the Bi-SC to create a strategy on Joint Air Power

and provided direction to develop a new definition of the Air LoE for inclusion in PG19. During the development of the JAP strategy, the MC has tasked the Bi-SC to conduct a separate study with the goal to provide an updated means of measuring level of effort. In March 2017 SACT requested the support of the JAPCC to conduct this study. The results are to be presented as a coherent set of metrics and/or criteria for present and future joint air power capability employment in operations ranging from Small Joint Operations to Major Joint Operations+ (MJO+) as a single reference document. The Draft study was provided to ACT in early November 2017. Bi-SC Staffing will be conducted until the end of January 2018. The final result will be judged by senior officials from a Military Judgement Panel of NATO's key Stakeholders. The final product and the new definition for Air Level of Effort will be offered for inclusion in PG19.

Command and Control of a Space Surveillance and Tracking (SST) Network. This is a continuing project from 2016. Based on a Request for Support from the Italian Air Force Staff, this project aims at analysing and defining the best solution for a C2 model for a multinational SST network. The project will also emphasise the advantages of an EU SST network for the Alliance and promotes the importance of Space Situational Awareness and SST in support of NATO military operations. This project is expected to be completed early in 2018.

Component Integration Challenges Stemming from Advanced Layered Defense Systems (A2/AD). As the principle theme for this year's Maritime Air Coordination Conference, co-chaired by JAPCC and Commander Maritime Air NATO, this topic grew in importance throughout 2017. JAPCC crafted a presentation to educate each of the Components about challenges which their partner components face in an A2/AD environment with a goal to facilitate improved coordination in the future. The secondary focus of this presentation was to articulate how the NATO exercise series fails to address these issues and offer solutions to improve the exercise programme as well as training audience performance in this near-peer competitor environment. Following the MACC, this brief was presented to Commander Naval Striking and Support

Forces (STRKFORNATO) to foster improved integration with the US capabilities that STRKFORNATO overseas. Finally, this brief was given to COM Joint Warfare Centre as part of JAPCC's annual support to NATO exercises. COM JWC not only endorsed the concepts, themes and findings in this report, but requested JAPCC represent this issue to COM JFC-Brunssum, and the Command Group at NSHQ and SHAPE. This roadshow was completed in Oct 2017 in time to lead-turn the execution phase of Exercise TRIDENT JUNCTURE. At the request of COM JWC, JAPCC provided an unclassified thesis in the December 3-Swords magazine to further enhance visibility on this issue. The results of this education campaign were seen in changes to exercise scripting as well as senior staff awareness of the joint nature of the problem, improving NATO's readiness to respond in this environment.

Cyber. JAPCC was engaged in strengthening NATO's Cyberspace defence posture contributing expertise to policy development/review, working groups, and through exercise support. The key to success is raising our collective understanding of Cyberspace, particularly as it pertains to the projection of Joint Air Power. The main effort has been supporting the Cyber Defence Action Plan and raising awareness among staff, operational personnel and senior leadership/decision-makers.

The review of NATO Allied Joint Doctrine for Cyberspace Operations Doctrine, AJP-3.20 (Draft) by member nations continued through 2017. Drafted in January 2016, the custodian (Cooperative Cyber Defence COE) expects to have received and incorporated feedback by the end of 2018. ACO, meanwhile, is leading the way to influencing policy development via chairing the ACO Cyberspace Workshop and managing and monitoring progress through the Cyber Road Map. The JAPCC, a key member, attended the ACO Cyberspace workshop in October 2017 and recommended more focus on familiarizing senior leadership and all stakeholders (training audience and participants) of major exercises on the potential of Cyberspace (both risks and benefits) to Joint Air Operations to include the promulgation in training narratives of the adversary's most probable Cyberspace Campaign Plan based on real-world assessments by NATO Intelligence experts.

JAPCC researched and prepared a White Paper offering avenues for NATO to be able to exploit the effects of offensive cyber operations, a capability not currently endorsed by NATO (as a defensive alliance) nor for which it is resourced within its Command or Force Structures, but for which some member nations have established capabilities. It was assessed that a defensive posture alone is insufficient to protect our critical Cyberspace infrastructure, and that we need to be able to exploit the potential of offensive cyberspace operations to achieve an adequate level of defence. The recommendations included leveraging current processes (such as the NATO Intelligence community's Request for Information (RFI) processes) and establishing Cyberspace Liaison Officers from member nations to advise commanders and assist mission planning cells.

JAPCC provided a Cyberspace SME as the Chief OPFOR Cyber for the development of the Cyberspace scenarios and for the execution phase of Exercise Trident Juncture 2017 in order to provide a realistic, challenging Cyberspace campaign from an adversary in an MJO+.

Space support to NATO operations. The JAPCC continued to champion the evolution of Space Power within NATO, mainly through their participation in the Bi-Strategic Command Space Working Group (NBiSC-SWG), which reports directly to the NATO Military Committee (MC) and which is committed to the evolution of the space support for alliance military operations. Since June 2016, the NBiSCSWG has a new mandate, 'NATO's approach to space – follow-on work'. In the frame of this new mandate, the JAPCC contributed to the production of a 'Framework for a NATO Policy for Space Support in Operations', as the first step towards a comprehensive NATO space policy.

Doctrine, Standards, and Procedures

Over the last year, the JAPCC led and participated in the following doctrine efforts:

Authorship and Custodianship of MC-0610. This document is currently entitled 'Military Committee Policy for the Force Protection of Alliance Forces' and

was presented to a Military Committee Working Group (MCWG) on 6 September 2017 and was extremely well received by the nations. It was subsequently circulated for comment and only minor remarks were received. A revised draft was subsequently produced on 8 November 2017 and was sent out under silence. Given the positive feedback to date, it is hoped that by early 2018, the Alliance will have its first Force Protection Policy document. This should see the completion of a close to seven-year process to get a capstone document in-place for FP. Having an overarching Policy in place should considerably simplify the next review of AJP-3.14, Allied Joint Doctrine for Force Protection. Furthermore, this should be considered as a 'first step' in developing a single, overarching 'Protection' policy combining aspects of Security (Sy), FP and Defence Against Terrorism (DAT). Work has already commenced on re-writing C-M(2002)50, Protection Measures for NATO Civil and Military Bodies, Deployed NATO Forces and Installations (Assets) Against Terrorist Threats.

Custodianship of AJP-3.14. Joint FP Doctrine was produced hurriedly in the aftermath of the 9/11 attacks and as a result, had a number of deficiencies that required the development of an Allied Command Operations (ACO) FP Directive (AD 80-25, page 13) to overcome. In late 2009 a Doctrine Review, albeit one that took five years to complete saw a far more

robust and fit-for-purpose document developed and the JAPCC was instrumental in this process. Since 2015, the JAPCC has been the Custodian of AJP-3.14 and is now preparing for another review. At the time of writing the Request for Feedback (RfF) process has been initiated and a Data Fusion Workshop (DFW) is planned for the first quarter (Q1) of 2018. Following the DFW, a number of Writing Teams are scheduled¹ with the intent of delivering a revised draft for consideration by the nations toward the end of 2018. It should be noted that with the JAPCC now at the core of NATO FP Policy and Doctrine development and as such is in a position to considerably improve the ease with which this major publication can be reviewed.

Revision of C-M(2002)50. At the NATO Force Protection Working Group (FPWG) held in Lisbon in November 2016, the NATO Office of Security (NOS) approached the meeting with a Request for Support (RfS) to assist the NOS in reviewing C-M(2002)50, Protection Measures for NATO Civil and Military Bodies Deployed NATO Forces and Installations (Assets) Against Terrorist Threats. This request was seen as entirely in accordance with the work of the FPWG and the RfS was accepted and the task was passed to the FPWG's Doctrine, Organisation and Interoperability (DOI) Panel². The DOI Panel held two Writing Team meetings at the JAPCC over the periods 19–23 June and 25–29 September 2017 to review C-M(2002)50 and as of the time of writing, the first complete review of the document has been completed and a new structure for the revised document has been agreed. The JAPCC is now working to put the first revision of the document into its new structure before circulating for the next round of comments prior to the next Writing Team meeting planned for 5–9 March 2018. The aspiration is to develop, over time, a single policy document that encompasses all of the 'Protect' area and covers FP, Sy and DAT. This is seen as a three to five-year project.

Authorship and Custodianship of ATP-3.3.6. This ATP is entitled: 'NATO FP Doctrine for Air Operations'. The majority of this publication was produced in the 2009/10 timeframe and was offered to the nations at this point for ratification. However, the overarching AJP was in the process of a protracted review (see



Custodianship of AJP-3.14, page 12) and the nations stated their intent to wait until the AJP was ratified before endorsing the ATP. The ATP was eventually ratified on 8 April 2016 and will therefore likely go into its first review during Q1 of 2019 and immediately after the planned completion of the AJP-3.14 review. In order to simplify the review process, the JAPCC maintains a 'working copy' of the document into which corrections and new ideas/concepts are incorporated at the time they are identified. The two major developments so far identified as needing incorporation during a review are, the need for more guidance in the areas of Force Protection Command and Control (FPC2) and Counter-Surface to Air Fire (C-SAFIRE) operations. Both new sections required have already been produced by the JAPCC as part of other pieces of work and will only need slight modification in order for them to be effectively incorporated into the ATP.

Custodianship of AD 80-25. The AD 80-25 is the ACO FP Directive. This document was originally developed to address the significant weaknesses identified in the original version of AJP-3.14, Allied Joint Doctrine for Force Protection (see Custodianship of AJP-3.14). However, with the revision (many would say re-write) of AJP-3.14 in 2015, the AD 80-25 ceased to be fit-for-purpose and the DOI Panel of the FPWG/JAPCC took responsibility for a review and subsequent re-write. The revised AD 80-25 was reviewed over a series of writing workshops held in 2016 and at the JAPCC during the course of 2017. A final draft of the new document was passed by the JAPCC to SHAPE for staffing on 1 September 2017. It should be noted that the 'new' AD 80-25 is a much smaller document due to the more comprehensive nature of the current AJP-3.14 and it is highly likely that following the next review of the AJP, the need for a FP Directive will be removed entirely.

JAPCC Support to the NATO Force Protection Working Group (FPWG). As a NATO Centre of Excellence (COE) the JAPCC is well placed to support the work of the FPWG. The primary means of delivery of this support is through the provision of the Chair for the DOI Panel of the FPWG. The DOI Panel is the body that delivers, on behalf of both the FPWG³ and the

Force Protection Advisory Group (FPAG)⁴ FP publications for the Alliance. In addition, the Panel addresses Organisation and Interoperability issues as they arise⁵. The JAPCC whilst focussing on the DOI sphere has previously provided expertise to help address operational challenges across the Capability Development, Lines of Development (LoD) spectrum⁶ in response to both terrorist attacks and the Crisis Response Urgent Operational Requirement (CUR) process. Future DOI Panel dates for 2018 are as follows:

- a. 5–9 March 2018 (Week 10).
- b. 25–29 June 2018 (Week 26).
- c. 24–28 September 2018 (Week 39).

At the time of writing, two RfS have been received from SHAPE, on behalf of the FPWG requesting JAPCC support to explore the following issues:

- a. To understand what are the FP implications of adversary use of Remotely Piloted Air Systems (working title only)?
- b. What are the implications for the Alliance of 'outsourcing' (or the contractorization) of FP requirements in operational environments (working title only)?

JAPCC Support to Force Protection Advisory Group (FPAG). Similar to the way in which the JAPCC supports the FPWG (the primary forum for the nations), the JAPCC also supports the FPAG (the primary forum for the NATO Command Structure (NCS)). Indeed, it was the JAPCC that advocated the establishment of the current organization (as Chair of the DOI Panel) that created an organization that was optimised to provide the correct FP advice, at the correct time and in the most effective form. As discussed elsewhere, the JAPCC is available to respond to either routine or urgent RfS from any entity within the NCS, the Force Structure or individual nations. A particularly useful example of this is the analysis and recommendations for change that the JAPCC produced as a result of an Urgent RfS to review NATO Alert States and Alert Measures following the January 2015 terrorist



attacks in Paris. This work continues to be of value today and is being incorporated into the ongoing review of C-M(2002)50⁷.

Air Contribution to Countering Improvised Explosive Devices. In the era of the NATO-led International Security Assistance Force (ISAF), there was considerable focus on countering the Improvised Explosive Device (IED) threat. A major JAPCC work stream was to explore how to optimize the contribution of all the available Air and Space Power resources and capabilities (this included employing personnel and systems in a way that was not originally envisaged or intended) in order to counter the IED threat (see 'NATO Air

and Space Power in Counter-IED Operations' Second Edition – a JAPCC White Paper (www.japcc.org)). The JAPCC currently maintains a 'watching brief' in this area and remains available on-call, to support the Counter-Improvised Explosive Device (C-IED) COE (Madrid), at short notice, if required.

AJP 3.3 Allied Joint Doctrine for Air and Space Operations. The JAPCC has the custodianship of NATO's doctrine on joint air operations, AJP 3.3, Allied Joint Doctrine for Air and Space Operations. The custodian succeeded in drafting a new version of the AJP-3.3 and having it ratified and promulgated (old version was dated 5 November 2009). Simultaneously,



the custodian prepared the Request for Feedback required for the next edition of AJP 3.3. A new Doctrine task was issued in early 2017, and a first draft of Edition C (WD1) was published in November 2017. The goal is to have AJP 3.3. 'Edition C' ratified by the end of 2018.

AJP 3.3.3 Allied Joint Doctrine for Air-Maritime Coordination. In October 2017, the Data Fusion workshop was conducted to discuss whether this doctrine was fit for purpose in its current form, as it currently is little more than a repeat of definitions found in other publications. However, leveraging the work from the Air Maritime Coordination WG which has spent the last two years improving ATP 3.3.3.1, the decision was

made to re-write this Level 2 doctrine with a more clear focus and purpose to inform the operational commander and staffs at the operational level. This will heavily leverage work done by JAPCC in development of ATP 3.3.3.1 (some sections were written with the specific intent to be lifted into the Level 2 doctrine, this thought process was accepted and will drive efforts in 2018).

AJP 3.3.3.1 Air-Maritime Coordination Procedures. Continuing efforts from 2016, JAPCC provided expertise to refine this doctrine and expand it from its previous narrow focus into a more holistic perspective on air and maritime component integration. Working

Draft 3 was finalized in September 2017 and a Ratification Draft is expected early in 2018. This work uncovered a need for modification to the higher joint doctrine, AJP 3.3.3, which was endorsed and accepted by the AJP 3.3.3 Data Fusion workshop in October 2017.

NATO Joint Intelligence Working Group (JINTWG).

Following the JAPCC's contribution to the successful promulgation of AJP 2.7 (Joint ISR) and AIntP-14 (Joint ISR Procedures in Support of NATO Operations), in 2016, the JAPCC went on with supporting the writing team of AIntP-16. This new doctrine on 'Intelligence Requirements Management & Collection Management (IRM&CM) Procedures' will provide the link between Joint Intelligence (AJP 2.1) and Joint ISR (AJP 2.7 and AIntP-14). Furthermore the JAPCC contributed to diverse doctrine and standardization documents in the field of Imagery Intelligence (AJP 2.8, IMINT TTPs, RECCEXREP, etc.), and helped provide the joint perspective to the drafting of ATP-102 on Maritime ISR.

ATP 3.3.4.1/3/4 Custodianship. The new editions of those studies were reviewed during the year. They are now ready to be ratified at the NSO. As the JAPCC holds the NATO ATWG Chairmanship, it continues to manage the focus of the AT community. The JAPCC also continues to be a contact point for coordination between NATO and EU organizations involved with AT.

ATP 3.3.4.2. The JAPCC has remained active in the management of AAR Doctrine, Standards, and Procedures. In addition to continuing as the NATO AAR WG Chair, the JAPCC continued its management of the global AAR compatibility and clearance matrix and built upon its relationships with other key AAR stakeholders, producing, updating, and disseminating standardized AAR documents (6 STANAGs/4 NATO SRDs/1 SRD template/20 National SRDs).

ATP-49 Custodianship. The ATP-49 custodianship will remain within the JAPCC. Review of the ATP is scheduled to be accomplished in 2019.

Within the Helicopter Inter Service Working Group (HISWG), the Helicopter Operations Panel (HelOps Panel) is responsible for helicopter standardizations. During the development of a new helicopter standard,

regarding competencies of helicopter crews, unclear and inconsistent terminology was identified.

During this review, it was decided to improve recognizability and readability of higher level documents (level 1 and 2) by renumbering the ATP according the Allied Joint Doctrine Architecture (AJDA), and adjusting the structure of the document. In 2018 a proposal will be submitted by the HISWG to the Military Committee Land Standardization Board (MCLSB).

NATO Helicopter Underslung Load (USL) Certification.

In support of the Helicopter Underslung Load Equipment (HUSLE) panel of the HISWG, the JAPCC completed the study of the current state of interoperability of NATO helicopter USL operations and published the White Paper 'NATO Helicopter Underslung Load Certification', at the end of 2017. This paper provides an oversight of current USL certification and interoperability practice across the responding nations. It can generally be concluded there is low or non-existing acceptance of USL of other nations during operations and exercises, as a result of unclear procedures and differences in certification regulations, missing harmonized standards and nation's regulations, different training levels and currencies of personnel, HUSLE used, and the lack of documentation sharing between nations. The recommendations given identify a workable way forward for the future to improve USL interoperability in NATO operations and exercises. To start the information sharing to improve the interoperability of USL operations in NATO, the HISWG will officially request the JAPCC to develop a USL Interoperability Matrix, accessible to all NATO nations and partners.

Education/Training and Exercises/Evaluation

During 2017, the JAPCC was active in the following ETEE areas:

Support to Major NATO Exercises. In April/May, JAPCC supported AIRCOM during its annual Exercise **Ramstein Ambition 17**. JAPCC provided an OPFOR air team to Exercise Control (EXCON), which executed a highly dynamic air scenario for the training audience.



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JAPCC was asked by the Joint Warfare Centre (JWC) to support both the development of the exercise scenario and the actual exercise execution for Exercise **Trident Javelin 17**. Starting with the development of the Skolkan 3.0 exercise scenario, the JAPCC was heavily involved and was successful in supporting JWC and the exercise with relevant Air & Space Power subject matter expertise. In November, a combined JAPCC team deployed to Stavanger, Norway, to support the execution phase of the exercise. JAPCC personnel were augmented by SMEs from CAOC Uedem, the Netherlands-, Hungarian and Finnish Air Forces, all of whom deployed as members of the JAPCC team. The deployed JAPCC team, as part of the overall OPFOR concept, challenged the Training Audience with a host of modern warfare threats including conducting a MJO+, A2/AD, peer-to-peer adversaries, TBM- and Space operations and Cyber. Over an eight-day period the small JAPCC-led OPFOR Air team was able to plan and execute nearly 6,400 sorties.

White Paper: NATO exercises from the OPFOR Air perspective. In addition to this exercise support, JAPCC produced a (classified) white paper which addresses several areas for improvement in joint exercising. Areas addressed are JFAC manning, scenarios, exercising changes in modern warfare, mindset of leadership and technical capabilities to support exercises.

Air Transport Exercises. The JAPCC participated in the development of the European Advanced Air Transport Training Course (EAATTC). JAPCC's active contribution to the Education and Training Ad Hoc Working Group resulted in the creation of a new training course for instructor pilots who will teach the EAATTC, designed to give them a higher level of standardization and expertise. In June the European Tactical Airlift Centre was opened, the JAPCC is following the development of the centre with the idea of acting as focal point for future endorsement of the courses.

Air-to-Air Refuelling Training. This year also saw the continued use of the Standardized Heavy Air Refuelling Course, a course created by JAPCC and AIRCOM personnel to train JFAC AAR planners and practitioners, culminating in the graduation of more than 90 multinational students. During the beginning of the year, the AAR SMEs in conjunction with NATO HQ IS-DI, EDA, MCCE, EATC and the Royal Netherlands Flight Test Centre conducted a three-day course focused on what it takes to obtain an AAR Clearances. This training was attended by 74 personnel from 16 nations representing 40 different organizations. The Table Top Exercise (TTE) was very well received and overwhelmingly requested to be an annual event with the next iteration taking place 13–14 March 2018 in Brussels, BEL. During the course of the year, three more mini-TTEs were conducted on both sides of the Atlantic.

Air Centric Personnel Recovery Operatives Course (APROC) 2017. This course, organized by the European Personnel Recovery Centre (EPRC), is one of the few European training activities addressing Joint Personnel Recovery (JPR). It is a multinational course run on a COMAO scenario. JAPCC participated in support of this course contributing to the academic part of the training and submitting JPR lessons to the participants. In addition, a JAPCC SME collaborated as Mission Monitor (MIMO) in the flying part of the course.

Support to Helicopter Air Advisor Training. As a result of NATO's Afghanistan operations shifting from ISAF to Operation Resolute Support (ORS), the Alliance has refocused various efforts from actual operations to the application and implementation of lessons learned, focusing on a battle rhythm of education, training, exercises and evaluation. Part of this follow-on effort is to train future ORS helicopter operators and maintainers on specific challenges they might encounter in Afghanistan. In support of this effort a group of four Central-European nations (Croatia, the Czech Republic, Hungary and Slovakia) utilize their unique knowledge and experience in operating Russian-made helicopters. These four nations participate in the pre-deployment phase of the preparation of air crews during a four-week training event which consists of a course in a simulation centre in Ostrava, Czech Republic and a live flying training series in Zadar, Croatia.

The JAPCC has regularly participated in this training event by sending a helicopter SME with an operational background and expertise in military advising, who gives classes on different subject matter areas in order to enhance effectiveness and overall safety of the work of air advisors.

Air FP support to the European Air Group (EAG). The EAG is an ideal start-point for any work as it is often easier to achieve consensus amongst the smaller group of seven participating nations. Equally, when presenting a project to the larger NATO group, it is of great benefit to be able to present from the perspective of already having eight (or more) nations already having reached agreement (or at least consensus). Under this Objective there are currently three major pieces of work being undertaken; these are:

a. Support to the VOLCANEX. VOLCANEX is an EAG-run FP exercise. It takes place in two forms; one is a full live-play Air FP exercise (which is referred to as a Deployed Operating Base Exercise (DOBEX)), the last of which took place in October 2016 at Lechfeld Airbase in Germany. The frequency of DOBEX is dictated by the willingness of nations to provide a training opportunity. VOLCANEX itself is an annual Air FP Command Post Exercise (CPX) that is run by the UK's Royal Air Force (RAF) Regiment at their FP Centre at RAF Honington. This year's event took place over the period 8–19 May 2017. At this event the role of the JAPCC was twofold. Firstly, to provide mentorship where necessary to senior positions and second, to run a workshop parallel to the CPX that looked to capture lessons identified during the CPX and incorporate them into Think Piece discussed immediately below.

b. Force Protection Command and Control (FPC2) Think Piece. This piece of work grew out of VOLCANEX/DOBEX 2016. The task to the JAPCC for this event was to attempt to capture how a multinational FP organization could be established and run. The original intent was to produce a paper for inclusion as an annex to the Post-Exercise Report (PXR). However, the EAG Headquarters' and the individual nations' interest in the product was such that it has been developed into a 'stand-alone' joint EAG/JAPCC White Paper. This product has been developed throughout 2016/17 through

a series of workshops held either at RAF Honington or RAF High Wycombe involving all of the interested parties. The target date for the publication of this joint EAG/JAPCC White Paper is January 2018.

c. Force Protection Advanced Course. The EAG nations have stated a desire for further, more advanced FP training. The JAPCC is working to combine this requirement with the NATO need (see NSO FP Course below).

NATO School Oberammergau (NSO) Force Protection Course. The JAPCC is the Office with Principal Responsibility for this course which aims to introduce NATO, Partnership for Peace (PfP), European Union (EU), other likely partners and national staffs to NATO FP concepts and requirements. The course is designed to provide national FP specialists with an overview of how NATO conducts FP but, also provides non-specialists with an insight into the subject. It should be considered as a 'basic' course and does not produce FP specialists for employment in FP positions within NATO. The current course underwent a fundamental review and re-write in 2009 and has subsequently been updated again in 2012 and 2015. This said, the course continues to evolve as the operational environment develops. Over the period 11–15 September 2017 a review of the last three (3) years' worth of Course Critiques was undertaken and as a result, the current course can be described as being entirely fit for the purpose for which it was designed. Each year the courses are extremely well attended and they attract a consistent 85%+ satisfaction rating from the students. This is especially noteworthy given the huge variety of backgrounds of the students that attend the course. The next iteration of the course runs in March 2018.

NATO Advanced Force Protection Course. In conducting the recent review of course critiques described above, it became apparent that there is a clearly articulated need for further training beyond the current 'basic' course. This coincided with a request from the NCS, dating back to the May 2015 FPWG, to develop an 'advanced' course. Whilst there remains significant discussion regarding the contents of any 'advanced' course, the major impediment to delivering any such

course is a lack of resources both in terms of time and identifying sufficient supporting speakers with the necessary experience to deliver such a course. It should be noted that the EAG, also has the aspiration to develop more advanced FP training. In attempting to provide at least a partial solution, the JAPCC (as OPR) together with the NSO has agreed to allocate the third of the existing course weeks in 2018 (11–17 November 2018) to the running of a 'Pilot Advanced NATO Force Protection Course'. The course will consist of a handful of additional lessons over and above the current basic course but, will primarily focus on three areas: the conduct of a FP Estimate, the translation of the FP Estimate into a FP Plan, and how NATO conducts 'Quality Assurance' of FP Plans through the mechanism of the Force Protection Advisory Team (FPAT).

Cyber Support. JAPCC stepped up to fill the role as Chief OpFor Cyber for Exercise Trident Javelin 2017, at the request of SHAPE J6 Cyber, leading the preparation of Cyber injects and the Cyberspace Exercise Control/Opposing Forces cell during the Execution Phase. JAPCC also contributed to raising collective awareness and influencing policy development through participation in the ACO-led Cyberspace Workshop and the Cooperative Cyber Defence COE-hosted International Conference on Cyber Conflict.

Missile Defence

In preparation for the Air and Missile Defence Committee meeting, JAPCC is contributing to the Panel on Air and Missile Defense (PAMD) and contributed to the two PAMD drafting groups. Since the reorganization of the Drafting Group structure in late 2017, JAPCC is contributing to the PAMD Focus Group Meetings, which are a replacement of the Drafting Groups for future development.

Since mid-2015, JAPCC has been an active member of the multinational BMD experiment Nimble Titan and fills a position in the War Game Control Group. Furthermore, JAPCC provided the Exercise Director and the deputy in the Operational Control Group for the main IAMD exercise in the European theatre, Joint Project Optic Windmill that was held in June 2017.

Education and Training on Space Operations. Since May 2016, the JAPCC has been the Department Head (DH) for 'Space Support to NATO Operations'. As the DH for Space, the JAPCC coordinates findings and develops solutions for the E&T requirements identified by the Requirements Authority (SHAPE ACOS J3).

In March 2017 one Space SME from JAPCC joined a team with experts from NCS and nations in developing an advanced 'Space Support Coordinator Course' which will be conducted for the first time in 2018 at NATO School Oberammergau (NSO).

Moreover, as the Department Head for the NATO discipline of 'Space Support to Operations', the JAPCC undertook, together with ACT, a complete revision of NATO Education and Individual Training (E&IT) in space. The purpose of this update was the development of an improved space curriculum that addressed the E&IT requirements defined in coordination with the Requirement Authority for Space (SHAPE ACOS J3). The JAPCC also continued to foster the integration of Space into NATO operations by contributing to the space training experimentation into the Trident exercise series.

Active Engagement

The JAPCC continues to actively engage with various air power stakeholders through working groups and other face-to-face meetings. These engagements included but were not limited to:

The JAPCC Annual Conference. The JAPCC hosted a multinational team of distinguished speakers and panellists at the annual Joint Air and Space Power Conference, held in Essen, Germany, 10–12 October.

The theme for last year's conference, 'The Role of Joint Air Power in NATO Deterrence' provided the catalyst for important debate which will help shape thinking regarding the future development of effective Joint Air Power. The issue of deterrence was raised extensively in the previous two JAPCC conferences, both in the context of strategic communications and with regard to NATO's ability to operate in a

degraded environment. Appropriately then, this year's Conference was dedicated to deterrence and, specifically, to consider the role of Joint Air Power in delivering deterrent effect.

Top experts from the political, academic, military and media spheres debated, in four themed panels: Today's Security Challenges and Threats to NATO and Partners; Political Cohesion and Decision-Making – is NATO fit for Deterrence?; Deterrence from the 3rd Dimension – NATO's Current Capabilities and finally Joint Air Power – Urgent Priorities. The themes generated questions, how the Alliance and its partners might best evolve and leverage air and space capabilities to enhance Deterrence and sustain NATO's three core tasks. Additional information may be found in the recently published Conference Proceedings at www.JAPCC.org/conference.

Think Tank Forum (TTF). The fourth 'Joint Air and Space Power Think Tank Forum' was conducted in Poggio Renatico from 29–30 March 2017, graciously hosted by the Italian Air Warfare Centre. The objective of this forum was to have an inter-organizational exchange of POWs as well as to share information regarding composition and responsibilities of Think Tanks, Air Warfare Centres, Air Force HQs, and Military Academies of JAPCC's Sponsoring Nations. Participants discussed how to better support NATO/AIRCOM in fostering multinational cooperation and preventing duplication of effort. The Forum was most beneficial in identifying vectors for mutual cooperation and outlining ways for more efficient coordination of the various institutions' projects.

Joint Air and Space Power Network (JASPN). The Air and Space Power Network Meeting was hosted by the JAPCC from 14–15 November 2017 with participants from AIRCOM, the NATO HQ (Director Armament and Aerospace Capabilities), the European Union Military Staff (EUMS), the European Air Group (EAG), the European Air Transport Command (EATC), the Competence Centre for Surface-Based Air and Missile Defence (CC SBAMD) and the NATO Support & Procurement Agency (NSPA). Similar to the Think Tank Forum, the JASPN meeting helps to develop better synergies within the Air & Space Power community;

however, it brings together NATO and European multinational organizations instead of the sovereign national entities that attend the TTF. The main objective of the Forum is to share information regarding the transformation of Joint Air and Space Power in order to gain awareness of key areas of effort and discuss potential areas of cooperation and prevent duplication of effort. Therefore the JASPN focusses on creating mutual awareness regarding focus areas, informing about current programmes of work and ongoing projects, as well as establishing objectives for follow-on collaboration.

NATO's Long-Term Military Transformation (LTMT).

NATO's Long-Term Military Transformation (LTMT). The NATO Long-Term Military Transformation (LTMT) programme addresses the full range of security challenges, applies a unifying vision, and advances a conceptual framework for forces and capabilities required to succeed in future operations. To support this programme, JAPCC took part in both the Strategic Foresight Analysis (SFA) as well as the Framework for Future Alliance Operations (FFAO) Workshops.

The combined SFA/FFAO workshop were conducted in Rome (March 2017). The SFA serves as the foundation for the FFAO, which feeds the NDPP in both Step 1 and Step 2 – Determine Requirements. The specific SFA workshop results can be found in the SFA 2017 Report. As the SFA 2017 draft was finalised early September and distributed early November the sole focus of the October 2017 workshop in Stavanger was to review Chapter 3 of FFAO 2018. The draft will be staffed at ACT before a Bi-SC review in early 2018.

COE Programme of Work (POW) Workshop.

The primary purpose of this two-part workshop is to funnel NATO's inputs to the 2018 COE POW. As a result, JAPCC received 38 RfS to support NATO HQ and its subordinate commands. In accordance with NATO-wide RfS for POW-2018, JAPCC will engage in the requested activities, projects, and working groups on the subjects of NATO exercises, Lessons Learned, Remotely Piloted Aircraft Systems, Space, Autonomous Systems, Optimization of Air Land Integration, NATO Future ASW Concept, 5th Generation Integration, Integration of UAS into Maritime Operations, NATO



Defence Planning Process (NDPP), Strategic Foresight Analysis (SFA), Framework for Future Alliance Operations (FFAO), Aircraft Cross Servicing and NATO Global Programming.

Safety and Security Professionals Network. This network was started and is coordinated by The Hague University of Applied Sciences. The JAPCC is part of this network that links military, civilian security entities, industry and academia. The network comes together annually for a Seminar which took place during 2017 at the NATO School Oberammergau (NSO) during the period 11–12 April 2017. The JAPCC (and hence broader NATO FP) benefits from being part of this organization as it provides a mechanism where current 'best practices' can be shared. It is worthy of note that by being part of this network, the JAPCC has the opportunity to address an audience of young people who would not normally be exposed to current thinking about the development of Air and Space Power. The JAPCC provides the network with a number of inputs, including:

- a. Providing the university with inputs that help develop their curriculum for safety and security studies.
- b. Providing, where appropriate, guest lecturer support. In 2017 the JAPCC has supported the universities Counter-Terrorism Minor over the period 29–30 November 2017.

- c. Providing a six-month Internship opportunity for one of the universities students. The first internship is already in progress from 25 September 2017 until 31 March 2018 and has already proved a valuable opportunity for both parties.
- d. Providing the university with additional learning opportunities for their students. Under the auspices of this arrangement, seven students from the university attended the JAPCC Annual Conference over the period 10–12 October 2017. This activity proved so successful that other opportunities are being investigated for short-term internships and/or providing opportunities for students to attend JAPCC-run or JAPCC FP supported activities (e.g. the NSO FP Course).

Aircraft Cross-Servicing (ACS). AIRCOM is reactivating the ACS programme. JAPCC is supporting AIRCOM by providing guidance and recommendations on the most effective and efficient way to rebuild the ACS capability in the area of processes, organizational structure, and documentation, and assess potential additional ACS capability options for future employment to enhance this operational capability. In October 2017 JAPCC took over the custodianship of the ACS related STANAGs.

Air-To-Air Refuelling (AAR). The AAR SMEs conducted 15 presentations in 6 nations throughout the year focused on the education and information on increasing interoperability within the AAR enterprise worldwide. Two academic articles were published, one NATO STANAG and three Standards Related Documents received substantial review and update this past year. The AAR SMEs continue to meet with NATO HQ IS-DI and EDA on a quarterly basis to ensure that the strategic direction of the three agencies remain pointed in the right direction.

Maritime Air Coordination Conference (MACC). The Bi-SC MACC 2017 was co-chaired by Commander Maritime Air NATO (Commodore Andreas Vettos, Hellenic Navy) and JAPCC Assistant Director (Air Commodore Spit, RNL AF) and hosted at MARCOM Northwood 22–24 May 2017. The theme of this year's conference was 'Delivering Joint Effect from the Sea'.

During this event, JAPCC provided a brief on component integration challenges stemming from Advanced Layered Defense Systems (A2/AD). The findings in this brief generated further discussion between MARCOM, JAPCC, STRKFORNATO and CAOCs Uedem and Torrejon regarding issues which have been plaguing integration between air and maritime for over a decade with little movement. A decision was made to develop a joint white paper highlighting these challenges and requesting ACO involvement.

JAPCC Custodianships and Involvement in NATO Activities and Working Groups

JAPCC personnel fill chairmen, co-chairman, and panel positions on numerous NATO steering bodies as well as providing custodianship to a number of NATO Doctrine documents, as highlighted below.

Chairmanship

- Vice Chairman – ACG-2 (Effective Engagement);
- Air Operations Working Group (AOWG);
- Maritime Air Coordination Conference (MACC Co-Chair);
- NATO Air-to-Air Refuelling Working Group (AAR WG);
- NATO Air Transport Working Group (ATWG);
- Doctrine, Organisation, and Interoperability (DOI) Panel, NATO Force Protection WG;
- Vice Chairman – Next Generation Rotorcraft Capability Team of Experts.

Exercise/Campaign

- Nimble Titan 18, Wargame Control Group;
- Exercise Director Joint Project OPTIC WINDMILL (JPOW);
- Deputy Chair Operational Control Group JPOW.

Panel Member/Working Group

- Allied Future Surveillance & Control Project Group (AFSC PG);
- Air Capability Group 3 and NATO Electronic Warfare Air Group;
- NATO AEW&C Programme management Organization Board of Directors (NAPMO BOD);
- JPR Forum;

- Air & Missile Defence Committee (AMDC);
- Force Protection (FP) Task Force;
- NATO Special Operations Headquarters (NSHQ) in support of Air Development Program (ADP) for SOF aviation;
- Helicopter Inter Service Working Group (HISWG);
- European Personnel Recovery Centre (EPRC) calendar;
- Point Capability Group Unmanned Aircraft Systems (JCGUAS);
- Joint Capability Group Ground Based Air Defence (JCGGBAD);
- Maritime Operations (MAROPS) Working Group;
- Global Helicopter Operations from Ships other Than Aircraft Carriers (HOSTAC) WG;
- Multinational Through-deck and Aircraft Carrier Crossdeck Operations (MTACCOPS) Working Group;
- ACG 2 – Effective Engagement;
- Amphibious Operations Working Group;
- NATO Bi-Strategic Command Space Working Group (BiSCSWG);
- Next Generation Rotorcraft Capability Team of Experts;
- NLD SBAMD Policy Group;
- NLD Knowledge Network on SBAMD;
- Panel on Air & Missile Defence (PAMD);
- PAMD Drafting Groups/Focus Group;
- ACO Cyberspace Work Shop;
- BMD Operational User Group;
- RIPT AirC2IS;
- BiSC A2/AD Simulation Study;
- DEU A2/AD Working Group;
- Under Water Warfare Coordination Group (UWWCG);
- Maritime Multi-Mission Aircraft (M3A) Replacement Team Panel Member;
- STO SCI-301 Study Group;
- Joint Intelligence Working Group;
- Imagery Management Group.

NATO Policy/Doctrine/TTP Support

- AJP-3.3 Custodian;
- AJP-3.14 Allied Joint Doctrine for FP Custodian;
- AJP-3.3.3 Air-Maritime Coordination (Part of AMCWG);
- ALP-4.3 Air Forces Logistic Doctrine and Procedures (contribution);
- ATP-3.3.3.1 Maritime Air Coordination Procedures;
- ATP 3.3.4 I AT Doctrine (Custodian);

- ATP 3.3.4 II AAR Doctrine (Custodian);
- ATP-3.3.4.2 Air-to-Air Refuelling (Custodian);
- ATP 3.3.4.2 SRD 1 Guide to Obtaining AAR Clearances and Compatibility;
- ATP 3.3.4.2 SRD 2 Recommended AAR Aircrew Certification and Currency;
- ATP 3.3.4.2 SRD 3 Tanker Capabilities;
- ATP 3.3.4.2 SRD 4 Tanker/Receiver Clearance Compatibility Matrix;
- ATP 3.3.4.5 AAR Boom-Receptacle Requirements;
- ATP 3.3.4.6 AAR Pro-Droge Characteristics;
- ATP 3.3.4.7 AAR Signal Lights in Hose and Droge Systems;
- ATP-3.3.4.3 TTPs for NATO AT Operations (Custodian);
- ATP-3.3.6 NATO FP Doctrine for Air Operations (Custodian);
- ATP-49 (STANAG 2999) Use of Helicopters in Land Operations (Custodian);
- ATP 102 MISR (contribution);
- AlnP xx IMINT TTPs (contribution);
- MC-0610, FP Policy for NATO-Led Operations Custodian;
- AD 80-25 ACO Force Protection Directive Custodian;
- MPP-02 Vol. II;
- AxP xxxx (STANAG 3430) Responsibilities for Aircraft Cross-Servicing (Custodian).

Participation in the Air Defence Committee and Subordinate Bodies. The JAPCC remains an active participant in the Air and Missile Defence Committee and the PAMD and its subordinate working and focus Groups. Through continuous participation in these various bodies, the JAPCC supports the development of Integrated Air and Missile Defence policy.

1. Under the auspices of the NATO Force Protection Working Group (FPWG), Doctrine, Organisation and Interoperability (DOI) Panel which the JAPCC Chairs.
2. This Panel is chaired by the JAPCC's FP&DAT SME.
3. The Primary Forum for the FP SMEs from the nations.
4. The FPAG is the forum where the FP SMEs from the NATO Command Structure (NCS) and NATO Force Structure (NFS) come together either by Video Teleconference (VTC) or face-to-face.
5. Noting that the current structure of both the NATO Force Protection Working Group (FPWG) and the NATO Force Protection Advisory Group (FPAG) is the result of a number of years work and several major papers produced for both NATO HQ and SHAPE by the JAPCC.
6. Doctrine, Organisation, Training, Materiel, Leadership, Personnel, Facilities, Interoperability (DOTMLPFI).
7. Protection Measures for NATO Civil and Military Bodies Deployed NATO Forces and Installations (Assets) Against Terrorist Threats.

2018 outlook

2018 Focus Areas

Introduction. JAPCC regularly reviews and transforms its Focus Areas, PoW and organizational structure to ensure that it can continue to address current and future challenges and to provide key decision-makers effective solutions on Air and Space Power challenges, in order to safeguard NATO and the Nations' interests. The 2018 JAPCC Focus Areas were approved by the Steering Committee at their annual meeting in June 2017. In the broadest sense, the JAPCC could address any topic or capability within the realm of Air and Space Power, but closely following current developments throughout the world and within NATO, there are several topics requiring more prominent attention

than others. At the Warsaw Summit in July 2016, Alliance leaders committed to continuing to deliver on key capabilities, including Ballistic Missile Defence, Joint Intelligence Surveillance and Reconnaissance, and Alliance Ground Surveillance. These subjects, amongst others, provide the focus for the JAPCC's programme of work for the year to come.

Space Support in NATO Operations. NATO's operations and missions are heavily dependent on data and services from space assets, including the areas of communications, surveillance and reconnaissance, global positioning, navigation and timing, meteorology, friendly force tracking, space situational awareness and early warning.



In 2018, the JAPCC will continue to work to mitigate NATO's space dependencies within the construct of the BiSCSWG (NATO Bi-Strategic Command Space Working Group).

In particular, after the approval by the Military Committee of the 'Framework for a NATO Policy on Space Support in Operations' developed in 2017, the JAPCC will remain focussed on supporting the creation of a comprehensive space policy for NATO and on improving the space doctrine.

In the focus area of 'Education and Training', JAPCC – as the Department Head for Space – will prepare and conduct the Annual Discipline Conference (ADC) 2018 to assess the status of NATO E&T in the 'Space Support to Operations' discipline after the complete revision that took place in 2017. In addition, JAPCC's Space SMEs – in close cooperation with other Space experts from the NCS – will support the 'Trident Juncture 18' exercise to assess and refine concepts, C2, mechanism and relationships for space support to operations. The Trident Juncture 2018 will conclude the experimentation phase for the full integration of space as a training objective for the Trident series exercises.

Finally, in 2018, the JAPCC will publish the study 'Command and Control of a Space Surveillance and Tracking Network', an analysis of a C2 model to task a multinational network of SST sensors in order to populate a database of spatial debris and manmade objects.

Exercise Support. JAPCC will continue to provide substantial support to NATO exercises in 2018. Events to be supported will be Ramstein Ambition 18 at AIRCOM and Trident Juncture 18 at the Joint Warfare Centre (JWC) in Stavanger. JAPCC also provides continued support to the JWC in developing and updating exercise scenarios to include the latest developments in joint (and aerial) warfare.

Air Command & Control and Joint ISR. NATO is implementing a fully interoperable Air Command and

Control System (ACCS), which will provide for the first time a fully integrated set of tools to support the conduct of all air operations in real-time operations. ACCS also has the option to perform planning and tasking for air operations (e.g. OPTASK LINK, ACO etc.) which is referred as the non-real time environment. ACCS will make available the capability to plan, direct, task, coordinate, supervise, assess, and report on the operation of all allocated air assets in peace, crisis, and conflict.

Promote and showcase the effectiveness and relevance of Joint Air and Space Power as the critical elements in Air, Land and Maritime operations.

NATO will review the Comprehensive Operations Planning Directive (COPD) in the beginning of 2018. After the COPD has been validated, the Air Functional Planning Guide will then be reviewed as well. After the other Functions (Land, Maritime, CIMIC etc.) of the Operational Planning Process have been reviewed during 2018, the Operational Planning Process on the Tactical and Operational level will be fully updated.

Unfortunately, NATO is faced with a shortfall in Air Command & Control manning, primarily due to over-reduction of personnel at AIRCOM and the fact that the augmentation system for Joint Force Air Components is not institutionalised. This is exacerbated by the fact that some air forces seem reluctant to maintain or expand their knowledge of Air C2 processes and, as a result, the overall knowledge of these processes within NATO is bleeding away, sometimes at an alarming rate. JAPCC also suffers from a shortfall in manning with only one Air C2 and one Air Operational Planning position filled. However, the importance of Air Command & Control and Operational Planning requires that JAPCC remains actively involved in most of these topics to the extent that limited manning allows.

Against the backdrop of the changed security environment, C4ISR in NATO shows several shortfalls in policies, concepts, and structures which need to be addressed in order to maintain the operational edge. The adaptation of concepts and structures, the willingness to share information, and the availability of trained operators in sufficient numbers in the NATO Command Structure and in NATO Force Structure C2 elements are essential to nearly all improvement measures. Partnering with capable national JISR and Joint Force Air Component staffs is an indispensable prerequisite. JAPCC will play a contributing role in several working groups dealing with a multitude of topics.

Air and Missile Defence. At the 2014 NATO summit in Wales, it was decided to regularly review the implementation of NATO BMD capability. In April 2016, Initial Operational Capability of NATO BMD was validated and IOC was declared during the 2016 Warsaw Summit. There is one extra step on the road to FOC for NATO BMD called Enhanced Operational Capability, which is to be declared by the end of 2018. JAPCC is and will remain involved in various Missile Defence panels, meetings and working groups.

Logistics. NATO is required to be able to carry out a range of smaller but demanding operations, and the Alliance must retain the capability to conduct large-scale high-intensity operations including in support of collective defence. To undertake these missions, the Alliance must be able to launch and sustain these missions. Since only a few Allies can independently deploy and sustain their forces, it is important NATO and the Allies continue to pursue Collective Logistics in order to provide NATO commanders the greatest flexibility on current and future NATO operations. Therefore logistics work in NATO will be pursued along four main lines of effort: develop more capable and interoperable joint logistics capabilities at the required readiness; optimise Command and Control (C2) of logistics support; improve deployability of NATO forces; and enhance sustainability of NATO forces. JAPCC is engaged in these topics and will continue to be so.

Joint Precision Strike, including PGMs. NATO is continuously seeking to share the burden of provid-



ing expensive defence equipment more equally across the Alliance. A new multinational project was launched during the 2014 Wales summit to develop innovative ways of increasing the availability of munitions to the Alliance. With Denmark in the lead, the project focuses on multinational approaches toward



air-to-ground precision-guided munitions (PGMs). As of November, 2017 six Alliance nations had joined the project, placing munitions orders through NSPA that are scheduled for delivery in early 2018. In 2016, the JAPCC assumed the role of Vice Chairman of the ACG-2 (Air Capabilities Group focused on Arma-

ments), which will continue to devote much of its effort in the upcoming years toward addressing this Priority Shortfall Area.

Air Offensive Enablers (SEAD, EW, AEA. NATO recognizes the electromagnetic environment (EME)

Partner with relevant NATO entities and nations to promote and synchronize output and products.

as an operating environment. The major disciplines involved in Electromagnetic Operations (EMO) and operational support include Communications, Navigation, Electronic Surveillance (ES), Electronic Attack (EA) and Electronic Defence (ED). EW is military action that exploits EM energy both, actively and passively, to provide situational awareness and achieve offensive and defensive effects. EW, the conduct of EMO, is warfare in the EME.

Aerospace Capability Group 3 (ACG3) and NATO EW Advisory Committee (NEWAC) are the top level Alliance bodies, which are responsible for all aspects of EW in every domain. JAPCC will engage with the aforementioned bodies in order to provide support with Subject Matter Experts.

Air Support to Special Operations Forces. The Air Development Program (ADP) serves as the leader for NATO SOF Air/Aviation by determining and improving quantitative and qualitative aspects of SOF Air/Aviation across the network of NATO Special Forces Headquarters (NSHQ) nations and partners. ADP seeks to deliver high quality support to nations by providing policy, doctrine, training, education, assessments, and evaluation. JAPCC has been engaged with the ADP since its foundation and is actively involved with all the future development in support of AIR SOF. Collaboration within ADP and JAPCC was established in order to support and

develop the annual Air SOF Conference held mid-March at NSHQ. For 2018 JAPCC will support, in collaboration with the ADP, the NATO SOF Aviation Capability Development Roadmap an initiative that is part of the measures directed by Defence Ministers of NATO International Staff (IS) to enhance the NATO Defence Planning Process (NDPP) with the primary goal of increasing coherence amongst the Planning Domains (PDs).

JAPCC Joint Air and Space Power Conference, Essen Convention Centre, Germany, 9–11 October 2018

The Annual Conference is one of the most important events on the JAPCC's annual calendar. It brings together senior NATO and national military and political leaders, members of academia and industry partners in a forum that encourages open discussion of issues of strategic interest to the Alliance and partners. In 2017 discussions focussed on Joint Air Power's role in deterrence. The 2018 Conference will consider NATO Joint Air Power's role if deterrence fails. Panellists will consider the first phase of an all-domain conflict and what actions NATO must take in order to seize the initiative.

Conclusion. Thank you for taking the time to read the JAPCC Annual report for 2017. We hope you have found this report informative, and that it has given you a greater understanding of and appreciation for the value and relevance of the JAPCC to the Alliance. For more information on the JAPCC, please contact us via email at contact@japcc.org or visit our website at www.japcc.org.



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