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SyntheSys DEFENCE

SYNTHESYS DEFENCE COMMUNITY PORTAL

We are inviting members of the Tactical Data Link and wider Defence community to register to access our SyntheSys Defence Community Portal

The online portal gives you secure, easy access to useful tools and information which is aimed at both the Tactical Data Link and wider Defence community. Customers and colleagues have FREE access to the portal which includes:

- Free access to downloadable Technical Articles, White Papers and other useful resources;
- Capabilities and Limitations (Caps and Lims) database;
- Unlimited subscription to TDL Technology Magazine;
- Free Introductory Online Training Sessions:
  - Tactical Data Links;
  - Joint Range Extension Application Protocol (JREAP);
  - Network Design;
  - Multifunctional Information Distribution System (MIDS)/Link 16;
  - Link 22;
  - Variable Message Format (VMF).

To register to access the Community Portal please complete the registration form. Our team will then process your request and provide login details within two business days.

Find the registration page here:
https://downloads.synthesys.co.uk/PortalRegistration.asp?asset=ptlreg

SyntheSys DEFENCE

Letter from the MD

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Autumn 2023: Issue 16

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The Growth of Tactical Data Links: Navigating an Ever-Evolving Landscape

Welcome to Issue 16 of TDL Technology Magazine. Whether you're a seasoned reader or are exploring our content for the first time, we trust that this issue will enlighten and entertain.

The ever-evolving world of defence is seeing a robust expansion in the employment of Tactical Data Links (TDLs), and understanding this growth trajectory is crucial for all stakeholders.

For those seeking in-depth training insights, James Norful takes the lead on Page 7, presenting ‘Training to Keep Up with the Continuous Growth and Innovation within Tactical Data Links’. His perspective offers invaluable insights to ensure our defence personnel are always a step ahead in the world of TDL innovation.

Delving into the interplay between technology and TDLs, Kate Chandler crafts a compelling narrative on Pages 8-9, titled ‘Technological Innovation vs Tactical Data Links - Friend or Foe?’ Join her as she navigates the intricate balance between cutting-edge technological developments and the steadfast world of TDLs.

As always, we've compiled the latest TDL and pertinent defence industry news, ensuring you're up-to-date with the most recent developments.

Having recently attended the NATO Tactical Data Links Symposium (NTDLS), we gathered numerous insights and forged valuable connections. Now, with the year progressing, we eagerly await the upcoming International Data Links Symposium (IDLS). It promises to be yet another captivating occasion for learning and collaboration within our community.

To ensure you never miss an insightful piece, consider subscribing at www.tdl-technology.com and have our latest offerings delivered straight to your inbox.

Warm regards,

Mark Hudspeth

Managing Director
SyntheSys Defence Limited

SyntheSys DEFENCE

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Major companies operating in the TDL market are constantly identifying new ways of providing a comparable capability, in ever-increasing trends and with sharp rapidity, to sustain their position within the marketplace.

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GOT SOMETHING WORTH SHOUTING ABOUT?

We want to hear from you!

Have you got a burning question to ask?

Or perhaps a topic you feel doesn't get enough scrutiny?

Our industry forum is for you!

We are asking members of the TDL and related communities to come forward with different ideas and topics for inclusion in an open industry forum which is dedicated to you.

If you are interested in contributing, please contact Stephen Hartas: stephen_hartas@synthesys.co.uk

SyntheSys News

SyntheSys Defence Launches New Badges for Data Link Manager / Interface Control Officer (DLM/ICO) Course Attendees

SyntheSys Defence is proud to announce the launch of new badges for attendees of our DLM/ICO courses.

These badges serve as a recognition of the attendees' commitment to improving their knowledge and expertise in the critical field of Tactical Data Link (TDL) interface management.

SyntheSys Defence's DLM/ICO training course has been the training of choice for operators and technical personnel alike for many years and is the only end-to-end training of its type currently on the market.

Our robust training is delivered by high calibre and experienced trainers in an open and practical learning environment. The course is designed to provide attendees with a comprehensive understanding of TDL interface management principles and practices, including planning, execution, and troubleshooting.

Training Success, Den Helder, The Netherlands – DLM/ICO Course

We are pleased to announce the successful completion of our Data Link Manager / Interface Control Officer (DLM/ICO) course, held at the Nederlandse Belgische Operationele School in Den Helder, Netherlands from 3-21 April 2023.

The DLM/ICO plays a crucial role in the Tactical Data Link (TDL) interface, handling both planning and execution functions. Therefore, it is essential that the training covers a wide range of topics comprehensively. Throughout the three-week course, military and civilian personnel from The Netherlands, Germany, Belgium, Italy, and Finland gained an extensive understanding of planning, building, interacting, and managing Multi TDL architectures. The diverse group of students provided a rewarding learning experience, allowing for collaboration and the formation of valuable relationships for future operations.

The course focused on challenging learning outcomes through practical exercises, simulations, and real-world operational software. This interactive approach fostered a cooperative learning environment, enabling each student to progress with confidence and gain a comprehensive knowledge of each TDL. By developing this type of expertise, TDL planners and operators are better equipped to identify and fulfil the information exchange requirements of commanders in both training and operational scenarios.

To learn more about our best-in-class TDL and related training, visit: https://lnkd.in/dsKJigF
To talk to us about upcoming training courses, your training requirements, or our training format, please start the conversation by emailing: training@synthesys.co.uk

The Growth of Tactical Data Links: *Insights from ReportLinker*

The Tactical Data Links (TDLs) industry, crucial for secure military communication protocols, has experienced notable growth, driven by factors such as increasing global military expenditure. This is according to a detailed analysis by ReportLinker.

Expanding Tactical Data Link Market

TDLs provide a secure military communication protocol, enabling a smooth exchange of tactical data between platforms and commanders.

Based on findings from ReportLinker, the global TDL market, which stood at $7.39 billion in 2022, is expected to reach $10.07 billion by 2027. This indicates a compound annual growth rate (CAGR) of 6.2%.

Notable Players and Innovations

Innovation is a critical driving force in the TDL sector. Several significant market players, including General Dynamics Corp, Northrop Grumman Corp, BAE Systems, and Thales Group, are contributing to technological advancements in this industry.

Curtiss-Wright Defense Solutions is an exemplar of innovation, having integrated Link 22 support into its TDL solutions in November 2022. This step enhanced interoperability and capabilities for the United States military and coalition partners.

Mergers and Acquisitions: Reshaping the Market Landscape

The dynamic nature of the TDL market is also reflected in the mergers and acquisitions landscape. In January 2023, L3 Harris Technologies Inc. expanded its communication and networking capabilities by acquiring Viasat Inc.'s TDL product line for approximately $1.96 billion. Such strategic moves not only reshape individual companies but also influence the broader market trend.

The Influence of Military Expenditure

The increase in global military spending, which rose by 0.7% in 2021, is a significant driving force for the TDL market. The heightened demand for efficient and secure TDL systems is closely tied to this upward trend in military expenditure. As governments continue to prioritize defense spending, the growth of the TDL market is likely to persist.

In conclusion, as per the insights provided by ReportLinker's analysis, the TDL market is poised for sustained growth in the coming years. This growth will be shaped by factors like increased military spending, technological innovations, and strategic mergers and acquisitions. As these dynamics continue to evolve, so will the TDL landscape, promising a more secure, efficient, and robust future for military communication protocols.

Stephen Hartas

Continuous Training to Keep Up with Growth & Innovation within Tactical Data Links

James Norful - SyntheSys Defence Senior Consultant

In the fast-paced world of Tactical Data Links (TDLs) staying ahead of the curve is crucial for ensuring effective military operations and maintaining a competitive edge. Innovation within TDLs is directly linked to continuous learning and training. This article emphasises the importance of ongoing training as a key driver of both growth and innovation within TDL systems.

The evolution of Tactical Data Links has witnessed a transformative journey, becoming an indispensable component in modern military communications. Originally developed as basic point-to-point links, TDLs have evolved into sophisticated, network-centric systems capable of exchanging real-time data between diverse platforms and units. As warfare scenarios have grown increasingly complex and interconnected, TDLs play a pivotal role in enabling seamless information exchange, coordination, and decision-making among military forces. The dynamic nature of TDLs is underscored by the constant advancements in technology and the ever-changing threat landscape. To effectively respond to emerging challenges and maintain superiority on the battlefield, continuous innovation in TDLs is imperative, ensuring their adaptability, security, and resilience in the face of evolving threats and operational requirements.

The field of TDLs is experiencing rapid and transformative technological advancements. Link 11 is quickly approaching its sunset date; Link 22 is emerging as more nations look to implement it into their architectures, and Link 16 is undergoing a massive change with more advanced terminals such as Block Upgrade 2 (BU2) and Joint Tactical Radio System (JTRS) that will completely change the way we have implemented the link into operations. As TDL systems evolve, it becomes essential for professionals to stay ahead of the curve and adapt to these new technologies effectively. Continuous training plays a crucial role in equipping personnel with the necessary skills and knowledge to navigate the complexities of emerging TDL technologies.

Through training, individuals can learn how to seamlessly integrate these advancements into existing systems, ensuring compatibility and interoperability across various platforms. Moreover, well-trained professionals can leverage the potential of these new technologies to enhance tactical operations, maximising their effectiveness and efficiency in military communications. By embracing ongoing training and keeping pace with technological developments, TDL experts can position themselves at the forefront of innovation, making significant contributions to the continuous improvement of military communication capabilities.

Continuous training empowers TDL experts to tackle the complex challenges that arise in the domains of system integration, interoperability, and security. As TDL systems become more sophisticated and interconnected, ensuring seamless communication among diverse platforms and units becomes a challenging task. Through training, personnel gain in-depth knowledge of system architectures, data protocols, and network configurations, enabling them to identify and address potential bottlenecks or points of failure. Trained experts possess the expertise to troubleshoot and resolve integration issues, ensuring smooth data exchange and synchronisation.

Additionally, training equips professionals with the skills to ensure interoperability between different TDL systems used by various military forces, so facilitating joint operations, and enhancing situational awareness. Moreover, with the ever-increasing cyber threats, security becomes a critical concern. Training helps TDL experts develop robust cybersecurity measures, safeguarding communication channels from unauthorised access and potential cyberattacks. By honing their problem-solving abilities through continuous training, TDL experts can confidently overcome complex challenges and maintain the reliability and effectiveness of Tactical Data Link operations.

In conclusion, the importance of training in keeping up with growth and innovation within TDLs cannot be overstated. Continuous learning empowers professionals to adapt to advancements, overcome challenges, and drive innovation in military communications. By investing in training programmes and promoting a culture of learning, TDL organisations can stay at the forefront of innovation and ensure mission success.

Technological Innovation vs Tactical Data Links - Friend or Foe?

Kate Chandler - SyntheSys Defence Senior Consultant

‘Speculate to accumulate, innovation, be prepared to fail fast, reinvent the wheel’…we are all familiar with the speed at which technology is progressing, the levels of funding being provided by the defence industry and the public purse, and the pressing need to have a technological advantage over adversaries in an age where you may not even have time to blink.

At the time of writing this article the recent failure in the full delivery of services to United Kingdom (UK) aviation by National Air Traffic Services (NATS) was unbelievable, with service delivery hugely impeded following a ‘suspected’ fault with the flight planning system.

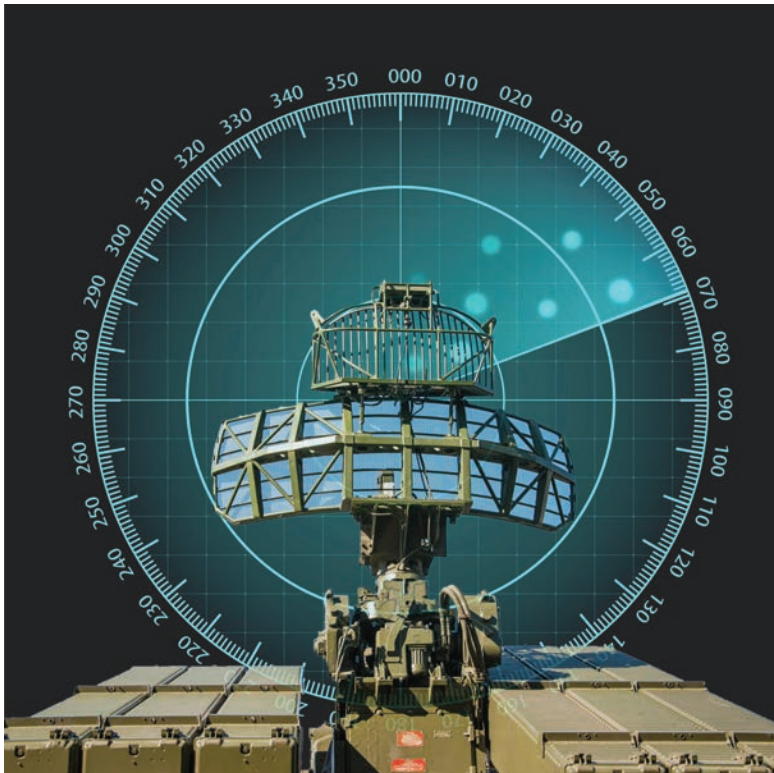
Prior to reducing the national capability from the Scottish Air Traffic Control (ATC) Centre at Prestwick and London Air Traffic Control Centre at West Drayton down to one Centre at Swanwick in 2008, there would have been extensive studies, risk analysis, resilience testing and innovative applications to ensure that safety would not be compromised, and the huge wealth gained by aviation economic output would be enhanced. But the approach was innovative, following in the direction influenced by the Single European Skies programme, initially signed up to by 29 nations and developed to increase efficiency, protect the environment, increase safety, and reduce costs.

Of course the decision to reduce service provision to one centre would not have been taken lightly, virtual contingencies form a key part in the provision of air traffic services; only last month (July 2023) the NATS General Manager for Air Traffic Services at Heathrow highlighted ‘…air traffic control operation is vital to the safe and efficient running of the airport, and given how important Heathrow is, not just to the UK but to global aviation, it’s right that it has an industry leading level of operational resilience…we have the chance to deploy some of the latest technologies to ensure that remains the case…’ despite this assurance it wasn’t the case only a few weeks later.

Oceanic crossings from the UK to the United States (US) are still simulated procedurally to ensure that flights can still take place in the event of a systems failure, but at a national level the unexpected capacity reduction in the provision of flight planning caught everyone out, or did it? Interoperability service requirements between the Air Navigation Service Providers should deliver a harmonised regulation with common requirements to guarantee the interoperability between different systems, constituents, and associated procedures in the air traffic management network, whilst ensuring the introduction of new agreed and validated concepts of operations and technology in air traffic management. Sound like a familiar problem for Tactical Data Links (TDLs)?

Algorithms may remove guesswork from the equation in ATC services, but is this not smoothing the jagged edges of innovation? The UK Government has invested £billions into Innovation, Knowledge Transfer Network, Transport Catapults etc., all in a bid to enhance economic growth and output. Put it another way, should modern technologies reconsider the need to rely on the founding principles which form the bedrock from which innovation grows?

Military operations need to continue in all scenarios, with or without a flight planning system, or even the reliance upon civilian ATC radars. The bedrock and foundation of the ability to safely deliver these services and protect sovereign interests is provided through the understated, world-wide TDL network.



TDLs, defined as standardised digital communication links, deliver the ability, and means, to exchange tactical information between platforms through secure bearer characteristics and transmission protocols, with or without civilian ATC services. Military personnel can exchange critical information, optimised as required by mission objectives of equipped platforms, through respective Information Exchange Requirements. Sounds good so far. However, technological innovation and expanding military requirements, at national, coalition and alliance levels have led to a myriad of systems, all of which have differing architectures, framework requirements, network designs, single source data and so forth. Synchronous protocols and message structures, integration requirements of the digitised battlespace, variable messaging, and the need to identify Friend or Foe. Not sure if technological innovation is a friend or not…

Too much information leads to an inability to decipher data quickly, not enough information and the outcome could be worse. Ensuring that the secure data requirements are captured, processed, and transmitted in a timely, effective, and accurate manner is priceless.

In 2023 the Tactical Data Link Global Market Report identified several trends and innovative evolutions in the development of TDL technologies. According to the report, revenue provided by the Tactical Data Link market is expected to reach $7.93 billion in 2023 alone, with growth exceeding $10 billion by 2027, due in part to the vast sums of worldwide investment following the ongoing hostilities between Ukraine and Russia.

As in any commercial industry, major companies operating in the TDL market are constantly identifying new ways of providing a comparable capability, in ever-increasing trends and with sharp rapidity, to sustain their position within the marketplace. In a bid to enhance interoperability and capabilities for the US and coalition partners, numerous companies are introducing operational support systems in the multi-domain environment, whilst seeking to provide specialist services that are unique to their deliverable.

But how sustainable is this approach? Constantly evolving standards, platform requirements and complex architectures demand testing, validation, and platform link integration. All of which are vital if the battlefield, air, and space commanders are to be fully informed to influence the battlespace decision making process. Information operations form the foundation in the fine, yet essential, line in keeping senior commanders abreast of rapidly developing situations. The innovative application of hypersonic weapons, satellite jamming, and situational awareness all influence the battlespace. In the time it takes to blink, the lack of documented integrated key flight data denied by the flight planning system failure could have been catastrophic, hence the flights were grounded to maintain safety.

Fundamental to the implementation of any innovative process is the need to fully assess the criteria, impact and ‘known unknowns’ of how the revisions will be implemented and integrated into the current environment. Effective requirements capture forms a key part of any project management programme. Multiple interfaces, standards integration, multi-domain meshing - all TDL characteristics which need to work at national, coalition and multi-alliance level. The recent failure experienced by NATS impacted the aviation network worldwide, no doubt any technological innovations which are set to be introduced in the future will be subject to deeper scrutiny, interoperability testing and resilience layers to ensure the risk management appetites are satiated.

The ability for military operators to maintain overwatch during a time of national crisis is paramount, and whilst nobody has used the terminology, the fragility and confidence of controllers and aviation users in the effective provision of services will have taken a knock, of that there is no doubt. Technological innovation enhances economic growth, alongside which the rapidity of change is often overlooked in a bid to develop the latest ‘innovative trend’. Ensuring that interoperability and resilience in the systems remains extant is fundamental, no matter how urgent the need for change is felt. Evolution or revolution? Maybe we need to collectively take a step back and ensure that when the technology fails the underlying principles can deliver the requirements in an assured, accountable, and safe manner.

ASK THE EXPERTS

We asked the TDL community 'Do you have any Tactical Data Link questions for our expert team that will be featured in our latest TDL Technology magazine?

Q: *"It is about Link 16. A DLP provides the MIDS with a number of FIM01s (FIM60 when using ET). Is it possible for a DLP to get a confirmation from MIDS terminal about which FIM is being transmitted right after it is? If so, how would it be? That way the DLP would be able to know which local (or remote due to dataforwarding) info is being TX and which is not? I am not after knowing the reason for the no transmission as it could be for several reason, mainly I guess due to a lack of TS (or for any other but providing the DLP does it well, the more likely reason would be a lack of TS)"*

A: "FIM 01 (common carrier) may contain many (up to 12, dependent on packing, no change for ET) 70 bit words to be used in the same time slot, equating to a maximum of 3, 6 or 12 J-messages dependent on packing (not including ET). Each FIM has a unique ID number, successful transmission or otherwise will be reported back in the status FOM02. If the message fails to transmit, the FOM02 also includes an amount of detail as to why."

Q: *"What do you envision for the role of Link 16 in Joint All-domain Command and Control?"*

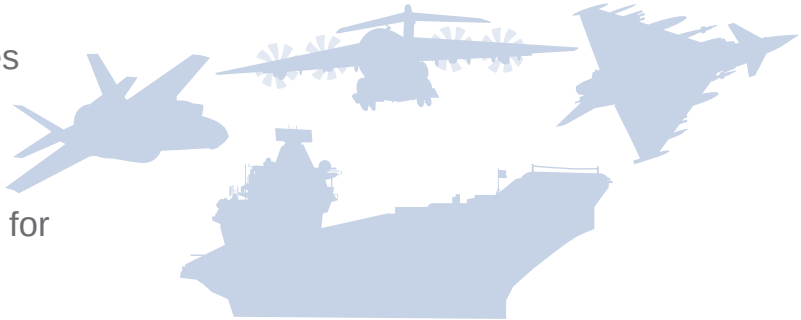
A: "L16 is the dominant Link for C2, it does not currently tick every box so other links need to be used, but it will remain the backbone for the foreseeable future. Acknowledgement of this perhaps is seen for the extension of the OSD beyond 2035."

Q: *"Do you envision running out of Link 16 timeslots?"*

A: "I see it becoming (more of) a headache for the network designers and planners to satisfy all platforms and the rules imposed by the various FCAs but with ET and other initiatives to gain more 'space' we should be good for quite some time. Having said all this, Dynamic network management is infrequently used around the World; it may be that we need to start using this more to keep us more agile and flexible for the users that really need those timeslots. Ask the question again in 10 years."

Q: *"What's next for Link 16 and are there plans for a successor?"*

A: "L16 has been extended beyond the first OSD of 2035. I am unaware of a successor at this time. I see the link evolving to include the use of IP based waveforms perhaps across a different frequency range, dependent on message needs and priorities. Changes maybe driven by the push to use L16 control for weapons and providing it to the dismounted soldier. Neither of which are well served by L16 to varying degrees currently."



TDLs - IN THE NEWS

CONSOLIDATED DEFENCE NEWS PIECES FROM AROUND THE GLOBE

Curtiss-Wright Announces New Capabilities and Enhancements of the Tactical Data Links Software for Link 16, MIDS-JTRS, and Link 22

July 2023 | https://bit.ly/45XKev2

Curtiss-Wright's Defense Solutions division has announced the latest enhancements to its TCG Tactical Data Link Core Software for Link 11, Link 16, Link 22, and VMF. The TCG Core Software is the foundation for all Curtiss-Wright TCG Tactical Data Link (TDL) verification, training, and simulation solutions, including the TCG Battlefield Operations Support System (BOSS) TDL testing and platform integration solution, the TCG Ground Tactical Data Link System (GTS), the TCG LinkPRO Tactical Data Link Processing Software, the HUNTR Multi-Link TDL Gateway, and the Radio/Terminal Housing Cases (THC). Curtiss-Wright, uniquely in the industry, invests its own IR&D resources to ensure that TCG TDL Software provides the most up-to-date implementation of supported tactical data link standards available.

Tactical Data Link Global Market Report 2023

May 2023 | https://bit.ly/3Eo3JAW

ReportLinker released TDL market insights in May predicting growth in the coming years.

Canada Tactical Data Link Market to Witness Substantial Growth During 2023-2032

May 2023 | https://bit.ly/3P6ck05

According to the research report, the Canada tactical data link market was valued at USD 1,060.18 million in 2022 and is expected to reach USD 1,695.42 Million by 2032, to grow at a CAGR of 4.8% during the forecast period.

US to Help Taiwan Upgrade Tactical Data Link System: Official

May 2023 | https://bit.ly/3P6ZHlu

The US will help Taiwan upgrade its data link system to NATO's Link-22. Link-22 is a secure beyond-line-of-sight communications capability that interconnects "air, surface, subsurface, and ground-based tactical data systems," Focus Taiwan wrote, citing the head of the Department of Strategic Planning Lee Shih-Chiang.

L3Harris to build RF and microwave tactical networking terminals to link sensors aboard aircraft and ships

May 2023 | https://bit.ly/3Rn0r94

WASHINGTON – U.S. Navy shipboard communications experts will develop and build digital tactical networking datalinks to enable the MH-60R multimission helicopter to share information from sensors in real time with surface warships under terms of a potential $141.8 million contract announced in April.

DoD satellites in low Earth orbit promise more connectivity for military users

September 2023 | https://bit.ly/3PqNqde

After completing two launches, the Space Development Agency will seek to test novel approaches to transmit data.

SpaceX launched SDA's second batch of satellites. The agency now has 19 communications satellites and four missile-tracking spacecraft in orbit. These make up the Tranche 0 portion of a projected network known as the Proliferated Warfighter Space Architecture.

"While the launch is very exciting news, it's what we will demonstrate on orbit that really matters — the ability to provide the warfighter with tactical data links, beyond line of sight targeting, and the missile warning/missile tracking of advanced missiles," SDA's director Derek Tournear said in a statement following the second launch of Tranche 0 satellites. DoD satellites in low Earth orbit promise more connectivity for military users - SpaceNews

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