



# EOS SpaceLink

## Investor Webinar

Tuesday 24 November 2020

# Important Notice and Disclaimer

## CONTENT OF PRESENTATION FOR INFORMATION PURPOSES ONLY

### Forward-looking Statements

This presentation may contain statements that are, or may be deemed to be, forward-looking statements. Such statements can generally be identified by the use of words such as 'may', 'will', 'expect', 'intend', 'plan', 'estimate', 'anticipate', 'believe', 'continue', 'objectives', 'outlook', 'guidance', 'forecast' and similar expressions. Indications of plans, strategies, management objectives, sales and financial performance are also forward-looking statements. Such statements are not guarantees of future performance, and involve known and unknown risks, uncertainties, assumptions, contingencies and other factors, many of which are outside the control of Electro Optic Systems Holdings Limited ABN 95 092 708 364) (EOS). No representation is made or will be made that any forward-looking statements will be achieved or will prove to be correct. Readers are cautioned not to place undue reliance on forward-looking statements and EOS assumes no obligation to update such statements.

No representation or warranty, expressed or implied, is made as to the accuracy, reliability, adequacy or completeness of the information contained in this presentation.

### Past Performance

Past performance information in this presentation is given for illustrative purposes only and should not be relied upon as (and is not) an indication of future performance.

### Information is Not Advice

This presentation is not, and is not intended to constitute, financial advice, or an offer or an invitation, solicitation or recommendation to acquire or sell EOS shares or any other financial products in any jurisdiction and is not a prospectus, product disclosure statement, disclosure document or other offering document under Australian law or any other law. This presentation also does not form the basis of any contract or commitment to sell or apply for securities in EOS or any of its subsidiaries. It is for information purposes only. EOS does not warrant or represent that the information in this presentation is free from errors, omissions or misrepresentations or is suitable for your intended use. The information contained in this presentation has been prepared without taking account of any person's investment objectives, financial situation or particular needs and nothing contained in this presentation constitutes investment, legal, tax or other advice. The information provided in this presentation may not be suitable for your specific needs and should not be relied upon by you in substitution of you obtaining independent advice. Subject to any terms implied by law and which cannot be excluded, EOS accepts no responsibility for any loss, damage, cost or expense (whether direct or indirect) incurred by you as a result of any error in, omission from or misrepresentation in this presentation.

# Important Notice and Disclaimer

## Preparation of Information

All financial information has been prepared and reviewed in accordance with Australian Accounting Standards. Certain financial data included in this presentation is 'non IFRS financial information' noting that the financial information relating to FY2019 is as yet unaudited. The Company believes that this non IFRS financial information provides useful insight in measuring the financial performance and condition of EOS. Readers are cautioned not to place undue reliance on any non IFRS financial information including ratios included in this presentation.

## Presentation of Information

The financial data in this presentation is provided on a statutory basis but in a non-statutory presentation format (unless otherwise stated).

- **Currency:** all amounts in this presentation are in Australian dollars unless otherwise stated.
- **Financial years:** FY refers to the full year to 31 December, 1H refers to the six months to 30 June, and 2H refers to the six months to 31 December.
- **Rounding:** amounts in this document have been rounded to the nearest \$(0.1)m. Any differences between this document and the accompanying financial statements are due to rounding.

## Third Party Information and Market Data

The views expressed in this presentation contain information that has been derived from publicly available sources that have not been independently verified. No representation or warranty is made as to the accuracy, reliability, adequacy or completeness of the information. This presentation should not be relied upon as a recommendation or forecast by EOS. Market share information is based on management estimates except where explicitly identified.

## No Liability or Responsibility

The information in this presentation is provided in summary form and is therefore not necessarily complete. To the maximum extent permitted by law, EOS and each of its subsidiaries, affiliates, directors, employees, officers, partners, agents and advisers and any other person involved in the preparation of this presentation disclaim all liability and responsibility (including without limitation, any liability arising from fault or negligence) for any direct or indirect loss or damage which may arise or be suffered through use or reliance on anything contained in, or omitted from, this presentation. EOS accepts no responsibility or obligation to inform you of any matter arising or coming to its notice, after the date of this presentation, which may affect any matter referred to in this presentation. This presentation should be read in conjunction with EOS's other periodic and continuous disclosure announcements lodged with the ASX.

# Today's Presenters



**Ben Greene**

**Group Chief  
Executive  
Officer**



**Glen Tindall**

**CEO,  
Communications  
Systems**



**Neil Carter**

**Chief  
Strategy  
Officer**

# Overview

EOS is Australia's largest aerospace entity and the largest defence exporter in the southern hemisphere



Reaching across **18** countries



**450+** Employees around the world



**\$800m**

R&D spent on EOS IP over 20 yrs, 75% from customers, most of this IP has not been exploited yet



**\$165m**

Annual revenue (FY19)

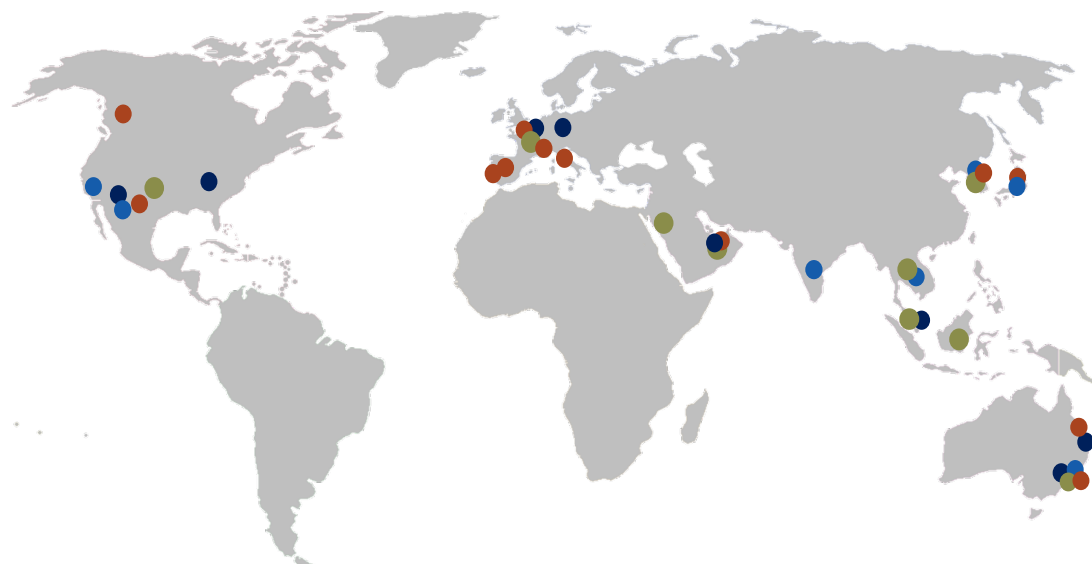


**\$570m**

Order backlog <sup>(1)</sup>

**\$3.1bn**

Sales pipeline <sup>(2)</sup>



● EOS Facility

● Defence Customers

● Space Customers

● Communications Customers

(1) The backlog figure represents the expected revenue EOS will receive from contracts which have been awarded to EOS but for which EOS has not delivered the products, as at 30 June 2020.

(2) The pipeline figure represents the potential revenue from specific customer requirements for which EOS has tendered for, or is registered and qualified to tender for over the following 36 months, as at 30 June 2020

# EOS Strategic Ecosystem & Synergies

## Synergies and Program Support

- High power laser technology
- Missile and UAS defence
- Laser tracking and discrimination
- Modelling for enhanced performance
- Common Defence and Gov't customers



## Synergies and Program Support

- Optical communications and adaptive optics
- Counterspace operations for asset protection
- Space traffic and constellation management
- Laser tracking and discrimination
- Common Defence and Gov't customers



## Synergies and Program Support

- C4 domain expansion from theatre to global
- Bandwidth for future remote operations
- Timely LEO ISR support for defence operations
- Integrated missile defence systems
- Common Defence and Gov't customers

# Strategic Evolution of EOS Communications Systems

## 2017

- Completed technology platform for optical satcom with x100 increase in capacity
- Plan to transition EOS customers from microwave (RF) to optical satcom by 2027

## 2018

- Agreement with US entities on EOS entry into satcom market, initially with RF
- Initiated acquisitions for spectrum and terminal-gateway technology required

## 2019

- Established cooperation framework with Collinear for hybrid RF-optical satcom
- Acquired EM Solutions, a world leader in satcom on-the-move
- Established EOS Communications Systems as an operating division of EOS Group
- Re-positioned EOS USA with special security arrangements for US government programs

## 2020

- Acquired the business of Audacy Corporation including FCC/ITU spectrum licenses
- Obtained US government FCC and CFIUS approvals for Audacy acquisition
- Acquired the communication technologies of Collinear, and AOptix Technologies – creating the largest known corporate aggregation of optical and RF-optical hybrid communication technologies
- Unveiled the name and technical description of the EOS SpaceLink satcom constellation and appointed sector CEO



# EOS SpaceLink: Highlights

## **SpaceLink will build, own and operate a Medium-Earth Orbit (MEO) satellite constellation**

- First constellation to be launched and operational in 2024 with positive operating cash flow
- Subsequent constellations to include optical technology

## **This will usher in a new era of satellite communications, avoiding the limitations of GEO and LEO orbits**

- High bandwidth / capacity, high security
- Low latency, low cost

## **SpaceLink addresses the highest value market segments**

- Primary market: Five Eyes (FVEY) Defense and Government customers with commitments to underwrite funding
- Secondary market: Commercial and Civil space users

## **Competitive advantages from spectrum allocation and optical IP**

- Comprehensive allocation in K, Ka, Q/V bands represents c. 64% of commercially available spectrum in those bands
- Introduction of hybrid RF-Optical technology to cement first-mover advantage

## **Project economics are compelling**

- EOS management modelling suggests NPV of US\$1bn per constellation, project IRRs of 20%
- US\$800m-\$1bn capex to be externally funded in a Special Purpose Vehicle



# Current Limitations of Satellite Communications

## **Satellite bandwidth demand is growing faster than supply**

- Bandwidth supply is limited by availability of radio frequencies (aka RF / microwave spectrum)
- Both GEO and LEO orbits are highly congested with little or no free RF spectrum available
- Hence future bandwidth needs to migrate from RF spectrum to Optical spectrum

## **It is difficult and expensive to provide continuous connection to LEO satellites**

- Vast majority of new satellites are in LEO orbit, very close to the earth, limiting their ability to download data in real-time
- LEO satellites cannot be viewed from a single ground station for more than about 10 minutes every 90 minutes. To provide continuous connectivity requires a huge investment in large networks of ground stations
- Even then it does not solve connectivity problems when above an ocean region and is reliant on insecure terrestrial networks

## **Current commercial systems are unsuitable for Defence & Government (D&G) customers' special needs**

- Commercial satellite systems optimised for consumer and business applications are often unsuitable for D&G customers
- D&G customers require high bandwidth and low latency with specific security specifications (ideally dedicated systems)

*EOS SpaceLink will provide a solution to these limitations on behalf of high value D&G customers*

# SatCom Landscape: GEO vs MEO vs LEO

## GEO - Geostationary Orbit ]

TV Broadcasting, Consumer  
Broadband & Telecommunications

- Cheap antennas
- Wide field of view
- Long asset lifetime
- Congested
- High latency

## LEO - Low Earth Orbit ]

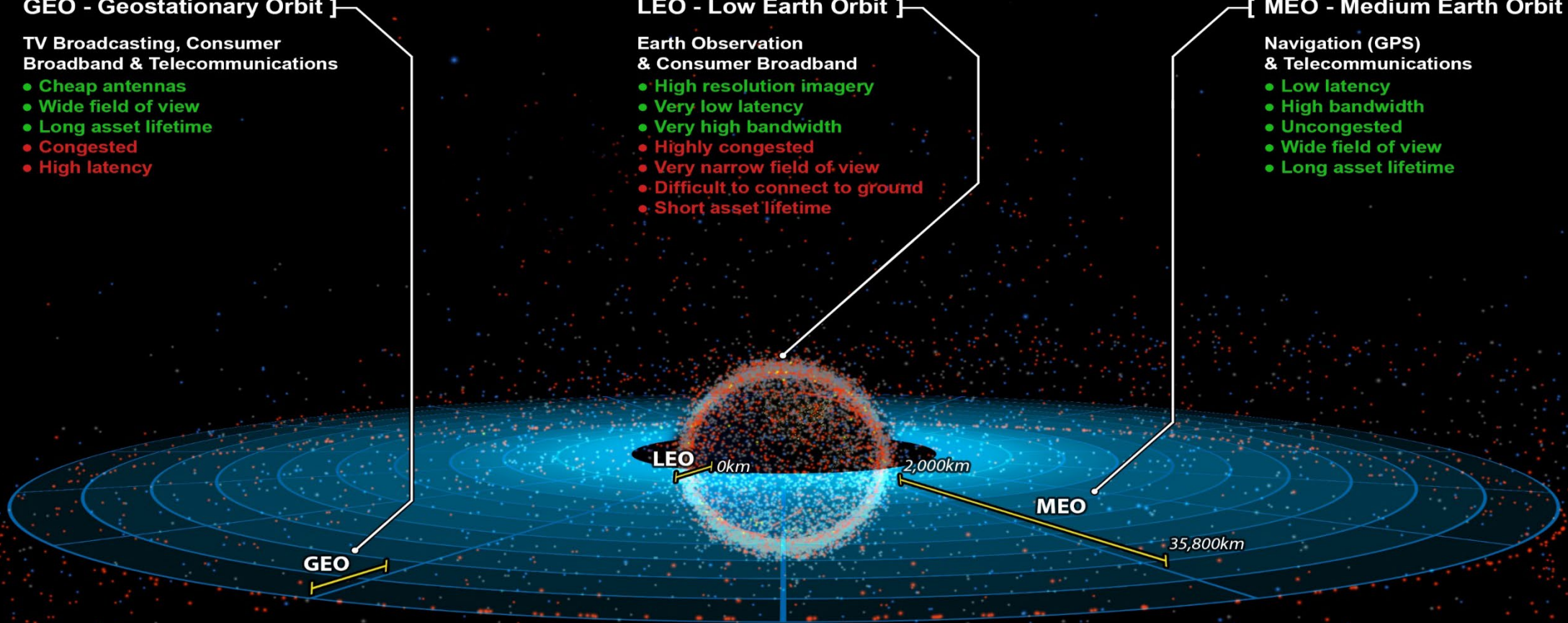
Earth Observation  
& Consumer Broadband

- High resolution imagery
- Very low latency
- Very high bandwidth
- Highly congested
- Very narrow field of view
- Difficult to connect to ground
- Short asset lifetime

## [ MEO - Medium Earth Orbit

Navigation (GPS)  
& Telecommunications

- Low latency
- High bandwidth
- Uncongested
- Wide field of view
- Long asset lifetime



EOS has a strong position in MEO with compelling competitive advantages in technology and regulatory approvals

# The SpaceLink Solution

## SpaceLink addresses the market need

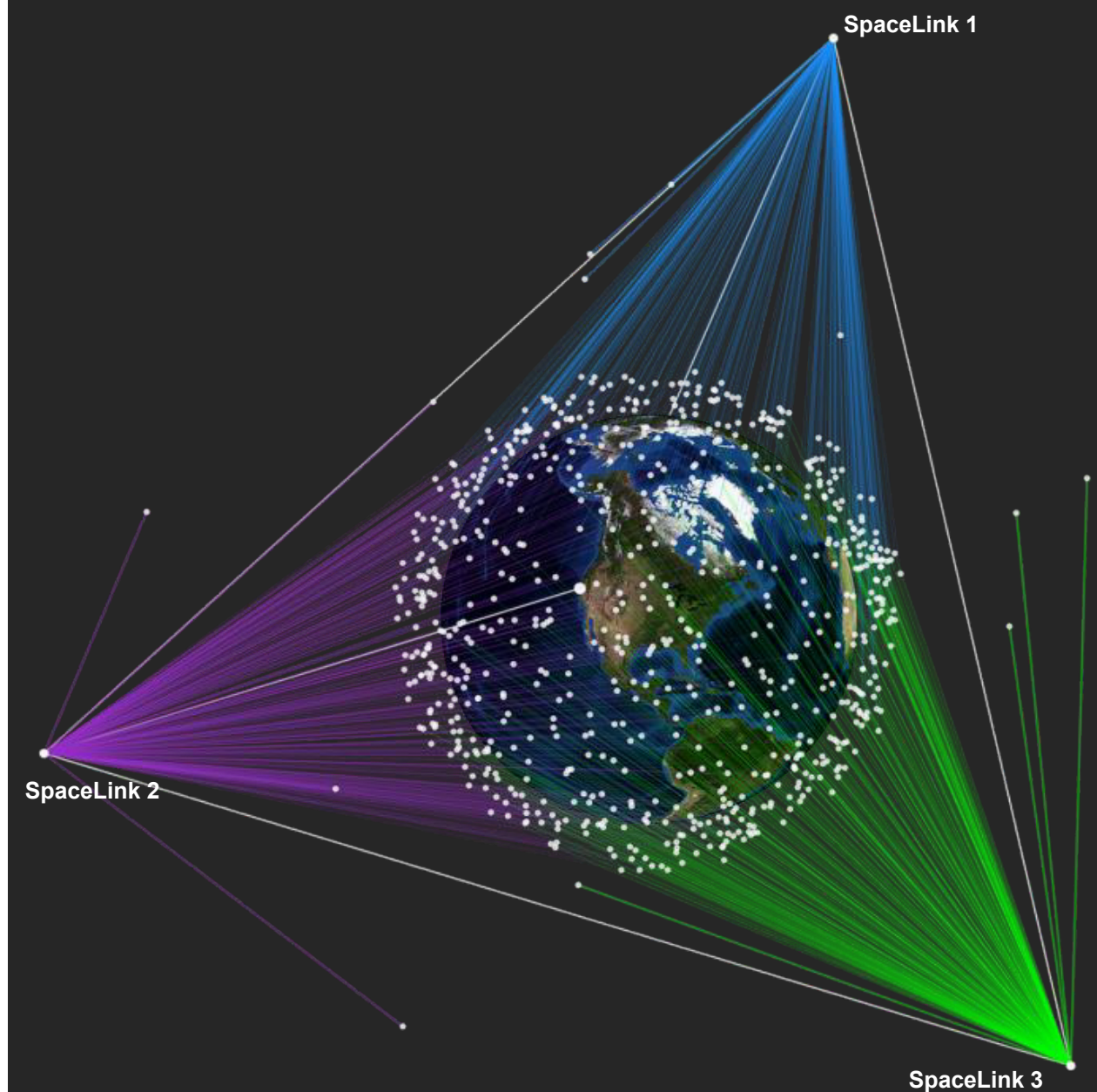
- Network optimised for high value customer requirements
- Supports users in space (LEO), on the ground, and at sea
- Delivers first 10x and later 100x increases in bandwidth

## Constellations of three satellites

- Comprehensive coverage from MEO at 14,000km above earth
- First constellation (2024) using existing RF technology
- Second constellation (2027) using hybrid RF-Optical technology
- Leverages EOS' proprietary optical IP

## Targeting high value customers who seek

- Continuous connectivity
- High bandwidth
- High resilience
- High security
- Low latency



# SpaceLink Target Markets

## Defense and Government (D&G) customers plus some Commercial



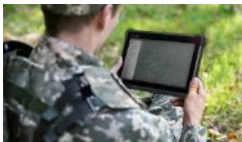
### Example D&G growth in data demand

#### Situational awareness/UAVs



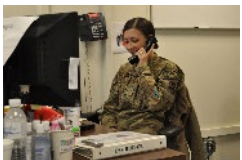
- High bandwidth applications
- Need for real-time data
- The military UAV market is expected to grow ~12.4% p.a. from 2018 to 2026

#### Imagery and video



- Defense modernization adding devices and data capture
- Centralized battle management system requires large volumes of secure data transfer

#### Data exchange / synchronization



- D&G agencies fast growing demand for email, voice and video data
- D&G data is highly sensitive, requiring secure communication that can only be provided by satellite
- Data synchronization across global locations moving to satellite networks



### Example commercial growth in data demand

#### Human space flight



- Human space flight by private and government agencies is data intensive
- Additional rigor and detail for monitoring passengers required

#### Earth observation

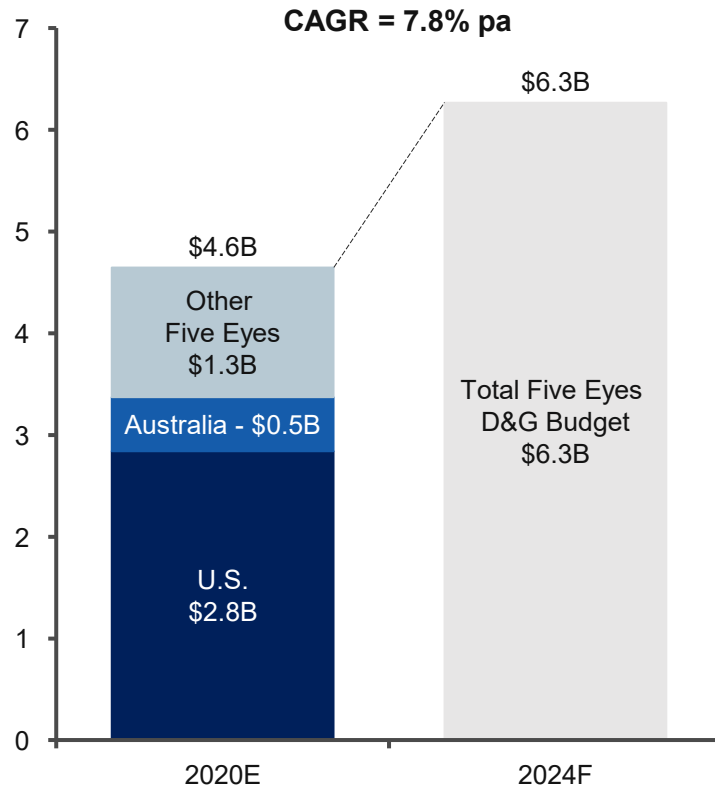


- Earth observation is increasing the amount of high resolution imagery
- Increasing environmental monitoring also requires major increases in data
- Continuous connectivity unlocks and enables new applications

# SpaceLink Target Market: Five Eyes D&G Customers

## Five Eyes D&G satcom budget growth (FY2020E-24F)

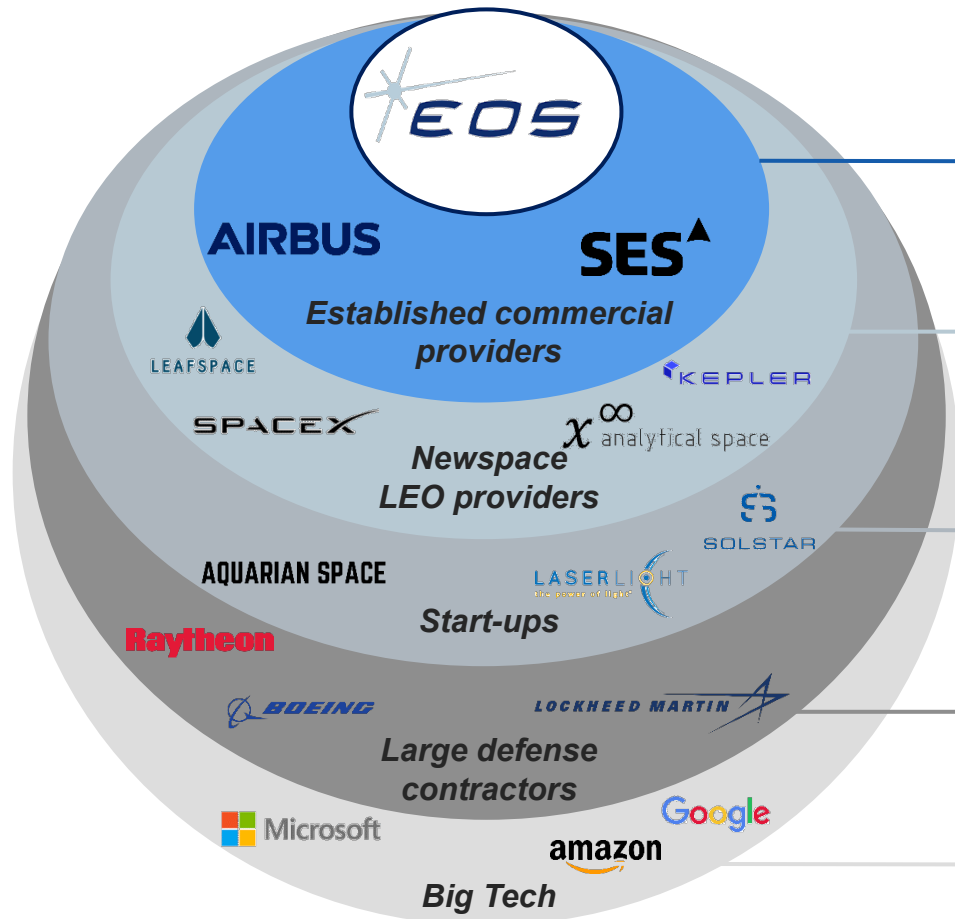
Billions of USD



- U.S. D&G budgets are forecast to grow ~7.8% p.a. through 2024F
- Similar D&G budget growth can be expected in other Five Eyes countries
- Overall addressable market US\$4.6B expected to increase to US\$6.3B by 2024
- EOS has strong, long-standing relationships with key Five Eyes D&G customers
- EOS SpaceLink is ideally positioned to participate in this market development

Source: Industry sources, market research, EOS estimates

# Industry Landscape: Potential Competitors by Adjacency



- Established commercial providers cannot match SpaceLink's combination of orbital radius, spectrum, future technology compatibility and speed to market

- Newspace LEO providers are looking at data relay for Five Eyes countries and have some spectrum capacity
- However, they have not optimized their networks for the security and resilience sought by D&G customers

- Whilst some start-ups intend to operate in MEO, they may struggle to secure funding and lack SpaceLink's speed to market and bandwidth

- Major defense contractors to date have focused on manufacturing and supply of satellites rather than service operations

- Big Tech providers focused primarily on consumer and IoT applications

Source: Northern Satellite Research, EOS

# SpaceLink Advantages

## Security, Resilience, Latency, Connectivity, Cost, Bandwidth, Scalability



### Security and resilience

- The MEO orbit is a superior space environment due to low density of spacecraft, adversarial threats and orbital debris
- Inclusion of MEO adds to resilience as LEO and GEO networks are likely to be compromised in a conflict



### Cost

- MEO is a more cost-effective solution compared with LEO due to long spacecraft lifetime (12 years vs 5 years) and small number of satellites required (3 vs hundreds)
- Ability to exploit advancements in optical technology keeps cost curve falling



### High-speed real-time connectivity

- The MEO orbit requires only 3 satellites to enable 'always-on' transmission and global coverage
- LEO can only downlink in the narrow timeframe where contact is made with the satellite
- MEO latency support real-time interactivity



### Available capacity

- LEO and GEO orbits are congested with satellites and space debris, and nearing maximum capacity
- The MEO constellation can be continuously scaled to increase bandwidth

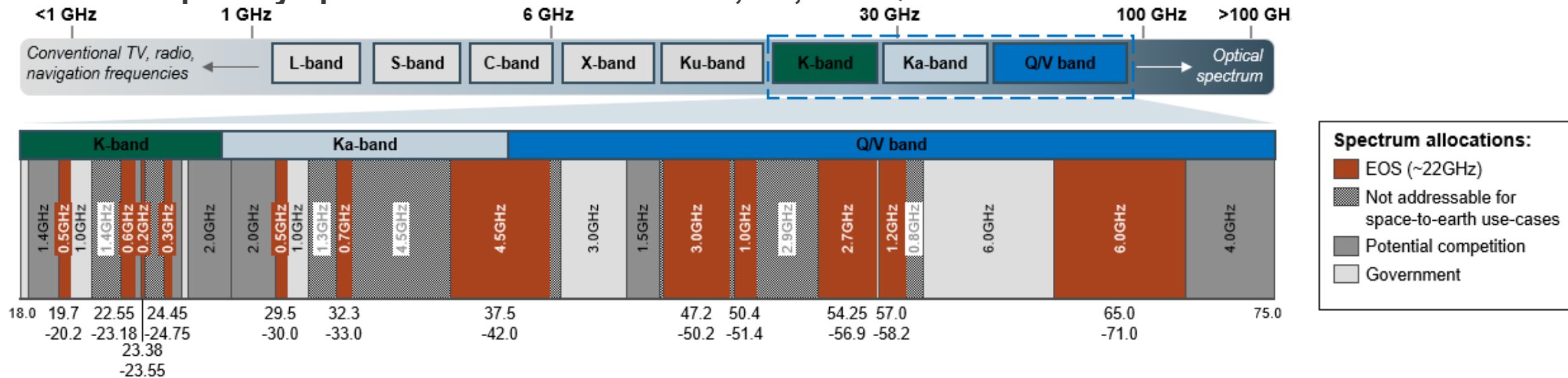
***With very few MEO constellations in orbit, SpaceLink has a first mover advantage and the opportunity to capture customers who seek a next-generation MEO constellation with state of the art technology***

# Competitive Advantage 1: Comprehensive Spectrum Allocation

## SpaceLink has a comprehensive spectrum allocation

- EOS' spectrum allocation provides first-priority rights to ~22GHz of spectrum in the K/Ka and Q/V bands, which is ~64% of the total commercially-available satellite spectrum in these bands
- This provides a sustainable competitive advantage for space to ground communications
- As EOS introduces optical technology, EOS' RF spectrum allocation will remain important for resilience and security

## EOS' first-priority spectrum allocation in the K, Ka, and Q/V bands



Source: EOS, Federal Communications Commission, International Telecommunications Union

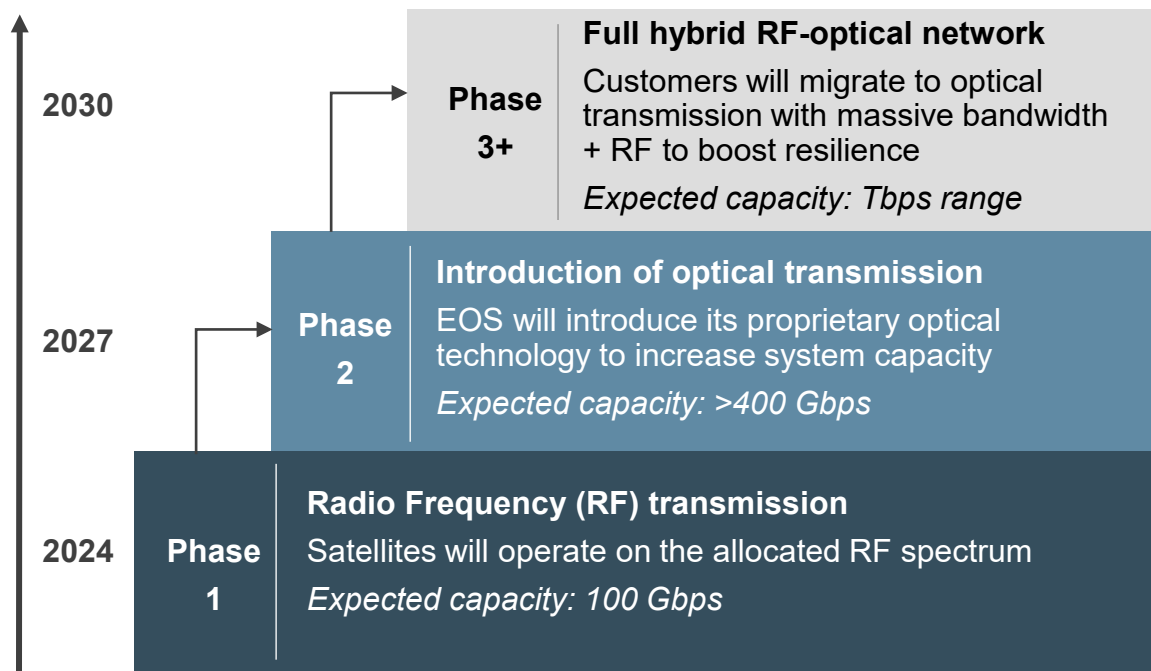


# Competitive Advantage 2: Technology

## Future Constellations Leveraging Optical IP

SpaceLink plans to transition to optical over multiple constellations, each higher speed and lower cost than the one before

SpaceLink plans to deploy new technologies and constellations in line with market appetite



- SpaceLink's planned innovation pipeline will allow margins to be retained in each phase without cannibalizing its own market
- SpaceLink will deploy its new technologies in line with customer demand for increased bandwidth
  - Optical transmission has the potential for 100x increase in bandwidth and a ~4x reduction in cost compared to RF
- EOS has first mover advantage for incumbent relationships with major D&G customers ahead of their transition to optical communications

Source: EOS

# SpaceLink Specifications

Space Link constellation key specifications		Base case assumptions
Orbit	Medium Earth Orbit (MEO) @ 14,000km	
Satellites	4 satellites (3 operational + 1 on-orbit spare incl launch costs)	4 x \$150m = \$600m
Ground Stations (Teleports)	6 (planned locations: Australia, U.S., Europe, Middle East)	\$220m
Control Segment	2 x Satellite Operation Centre / Network Operation Centre	\$180m
Total available capacity	100Gbps	
Saleable capacity	50-75Gbps	17% usage in Year 10
Spectrum allocation	22GHz in highly desirable K/Ka & Q/V bands	
Potential for Optical transmission	Yes, in later constellations	Optical not included in first constellation
Expected global data relay time	~300 milliseconds (required for 'real-time' responsiveness)	
Pricing expectations	Data transfer rate model (in Mbps / Gbps) declines 5-10% pa	Assume -10% pa
Operating expenses	\$30-35m pa	Assume \$35m pa
Asset lifetime	12 years	Assume 10 years
Primary market focus	Defense & Government communications	} Strong interest >\$150m pa > all costs
Secondary market focus	Data relay for LEO satellite operators	

# Project Economics: Base Case IRR = 20%

## Capex requirement = US\$800m - \$1bn

- Roughly equal tranches of US\$200-250m over four years in build phase (2021-24)
- Constellation to be launched and operational in 2024 with positive operating cash flow

## Mix of Debt and Equity funding = 70/30

- 70% debt / project finance from vendor finance / export credit agencies
- 30% equity from external sources into a Special Purpose Vehicle
- EOS contributes assets, staff and IP (no cash) and retains majority economic interest and control

## Project funding to be underwritten by customer commitments

- Operating expense of US\$35m pa + Depreciation of c US\$80-100m pa => total costs of US\$115-135m pa
- Will secure firm customer commitments for US\$150m+ to underwrite project funding

## Compelling economics

- Based on EOS' business plan with 8% WACC, Discounted Cash Flow valuation = US\$1 billion per constellation
- This produces Project IRR = 20% and Equity IRR considerably stronger

# Project Risks and Mitigations

## Risk to SpaceLink

---

**Bandwidth demand does not reach expected levels**

- Breakeven timing would be affected if customers purchase less bandwidth or if demand does not grow over time as expected

**Data relay services pricing deteriorates more quickly than expected**

- A more significant than expected deterioration in price point would require additional capacity utilization to meet the same break even timing

**Competitors are able to neutralize SpaceLink's key competitive advantages**

- Additional competitive threat would reduce SpaceLink's first-mover advantage and ability to secure key D&G customers

**U.S. government decides to build in-house system**

- Should the U.S. government abandon its stated intent to pursue commercial satellite communications partnerships, the data relay market would become less attractive for all potential vendors

## Risk mitigation

---

- U.S. D&G customers often price contracts in a manner ensuring vendors recoup investments; as necessary, SpaceLink could also take steps to broaden its scope beyond the Five Eyes
- Lower prices may introduce new use-cases and customer segments, driving increases in demand and offsetting overall revenue impact associated with price point deterioration
- SpaceLink's technical capabilities are difficult for competitors to replicate given its large spectrum allocation, existing optical IP, and strong reputation with U.S. D&G customers
- Public announcements and market feedback suggest this risk is very low as U.S. D&G customers face increasing pressure to reduce costs and drive service efficiency

Source: EOS

# SpaceLink: Timetable

Critical path items	Status	Due Date
External Business Model review	Complete	Q3 2020
Technical due diligence report	Complete	Q4 2020
Satellite manufacturer negotiations	Current	Q1 2021
Firm customer commitments	Current	Q1 2021
Debt / project finance commitments	Started	Q1/Q2 2021
Equity commitments	Started	Q2 2021
Satellite orders placed	Pending	Q2 2021
Satellite construction	Pending	2021-23
Ground stations (teleports)	Pending	2023
Control segment (SOC / NOC)	Pending	2023
Satellite launch and commissioning	Pending	2024

# Summary

## **SpaceLink will build, own and operate a MEO satellite constellation**

- First constellation to be launched and operational in 2024 with positive operating cash flow
- Subsequent constellations to include optical technology

## **This will usher in a new era of satellite communications, avoiding the limitations of GEO and LEO orbits**

- High bandwidth / capacity, high security
- Low latency, low cost

## **SpaceLink addresses the highest value market segments**

- Five Eyes Defense and Government customer commitments to underwrite funding (plus sales of space capacity to commercial players)

## **Competitive advantage from spectrum allocation and optical IP**

- Comprehensive allocation in K/Ka, Q/V bands represents c. 64% of commercially available spectrum in those bands
- Introduction of hybrid RF-Optical technology to cement first-mover advantage

## **Project economics are compelling**

- NPV of US\$1bn per constellation, project IRRs of 20%
- US\$800m-\$1bn capex to be externally funded in a Special Purpose Vehicle



# Questions and Answers

TEOS

