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April 17, 2017

Ms. Marlene H. Dortch
Secretary
Federal Communications Commission
445 12th Street, SW
Washington, DC 20554

Re: *Ex Parte* Meeting IB Docket No. 16-408

Dear Ms. Dortch,

This is to inform you that, on April 13, 2017, Daniel Goldberg, Michael Schwartz, and David Wendling of Telesat Canada ("Telesat") and the undersigned, met with the representatives of the Commission listed in Attachment A hereto to discuss Telesat's Petition for Declaratory Ruling to Grant Access to the U.S. Market for Telesat's NGSO Constellation and the positions stated in its comments and reply comments in the above-referenced proceeding. In addition, the Telesat representatives discussed the information contained in the attached presentation and gave a copy of the presentation to each of the Commission participants in the meetings.

Please direct any questions regarding this matter to the undersigned.

Respectfully submitted,

Henry Goldberg
Attorney for Telesat Canada
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1025 Connecticut Avenue, NW
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202.429.4900

cc: listed in Attachment A

Attachment A

Office of the Chairman:

Chairman Pai
Rachael Bender

Office of Commissioner O'Rielly:

Commissioner O'Rielly
Erin McGrath

Office of Commissioner Clyburn:

Daudeline Meme

International Bureau:

Tom Sullivan
Troy Tanner
Robert Nelson
Jose Albuquerque
Olga Madruga-Forti
Karl Kensinger
Clay DeCell

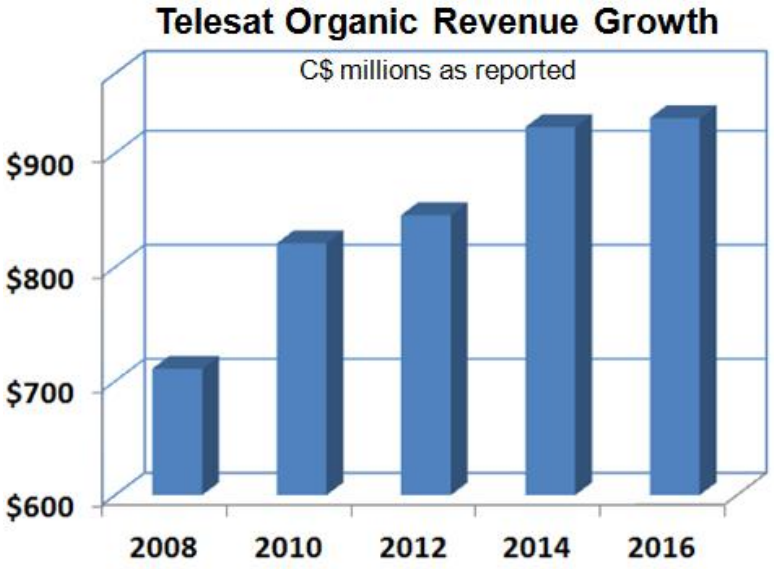
Overview of Telesat's LEO Initiative

Broadband Network with Unmatched and Differentiated Performance

April 2017

Telesat's Expertise

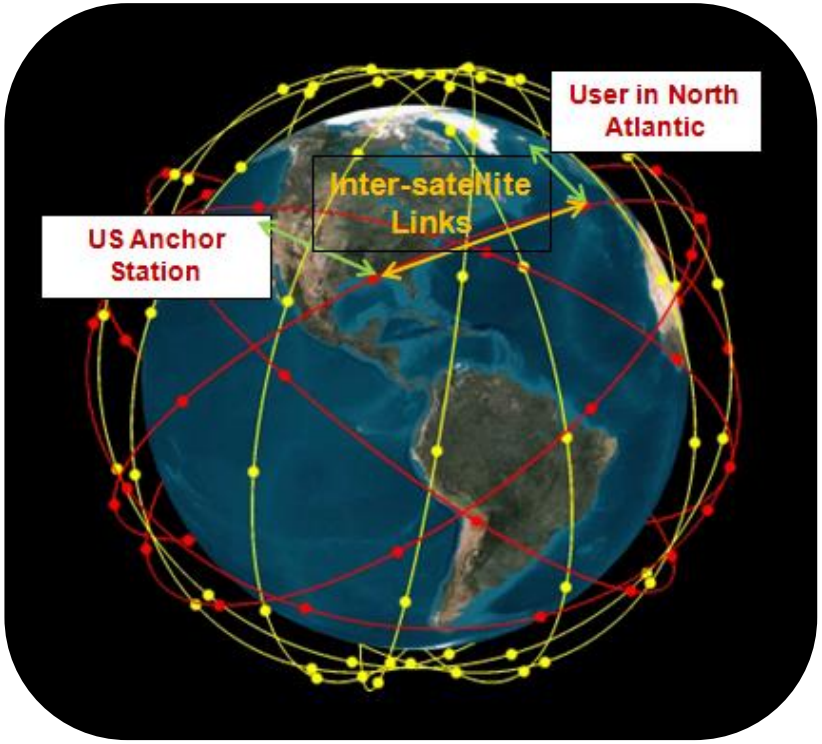
- Telesat is one of the largest and most successful satellite operators in the world, providing services to the private sector and governments
- Global fleet of 15 satellites with an additional two GSO and two NGSO satellites under construction
- Global teleport and terrestrial infrastructure that is seamlessly integrated with Telesat's satellite fleet
- Telesat's consulting practice supports the demanding requirements of customers throughout the world



Telesat Headquarters, Ottawa, Canada

LEO Overview

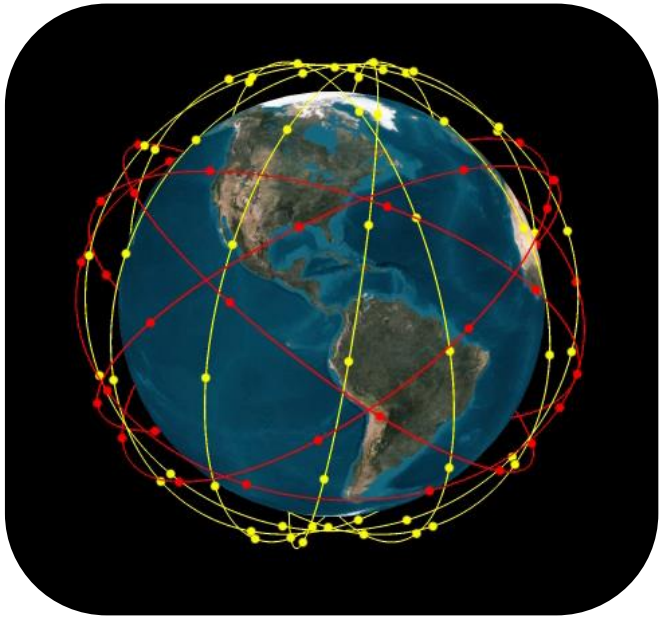
- Global constellation consisting initially of 117 interconnected LEO satellites
- Users connect to satellites via high-throughput spot beams
- Inter-satellite connectivity makes each satellite a node in a data network
- Satellite connects either:
  - Directly to a hub or another user, or
  - Indirectly via another satellite
- Highly integrated end-to-end system (ground and satellites designed and operated as a single system)
- Carrier Ethernet interface
- High potential for U.S. jobs – satellite manufacturing, launching, etc.



Telesat's design uses polar and inclined orbits to create a revolutionary global network

Key Accomplishments to Date

- Obtained priority ITU rights to LEO Ka-band spectrum on a global basis – approximately 4 GHz
- Developed an innovative (patent pending) constellation design and system architecture
- Procured two prototype LEO satellites for launch in 2017
  - Provides capability to perform testing and trials
- Discussions under way with potential partners



Target Users – Wide Variety of Broadband Applications

Enterprise Networks

Mobile Broadband

Government/ Military

Cell Backhaul and Telecom Trunking

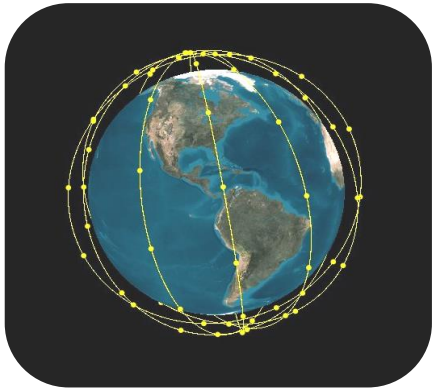
Consumer Broadband

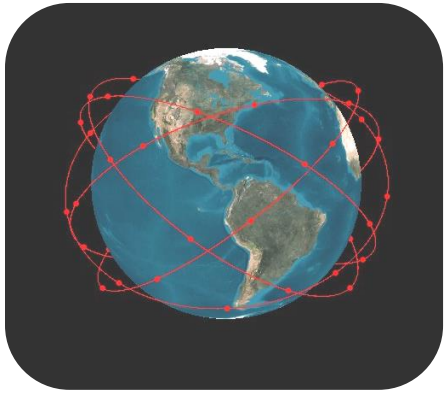
Resource Sector

Rural and remote

Telesat's Orbits – Efficient and Targeted Location of Satellites

- Combination of polar and inclined orbits





- Polar LEO – <u>global coverage</u>
  - Minimum of: 72 satellites, 12 satellites in each of 6 planes
  - Planes are inclined 99.5 degrees
  - Orbit altitude is 1,000 km
- Inclined LEO – <u>capacity focused on regions of highest demand</u>
  - Minimum of: 45 satellites, 9 satellites in each of 5 planes
  - Planes are inclined 37.4 degrees
  - Orbit altitude is 1,248 km

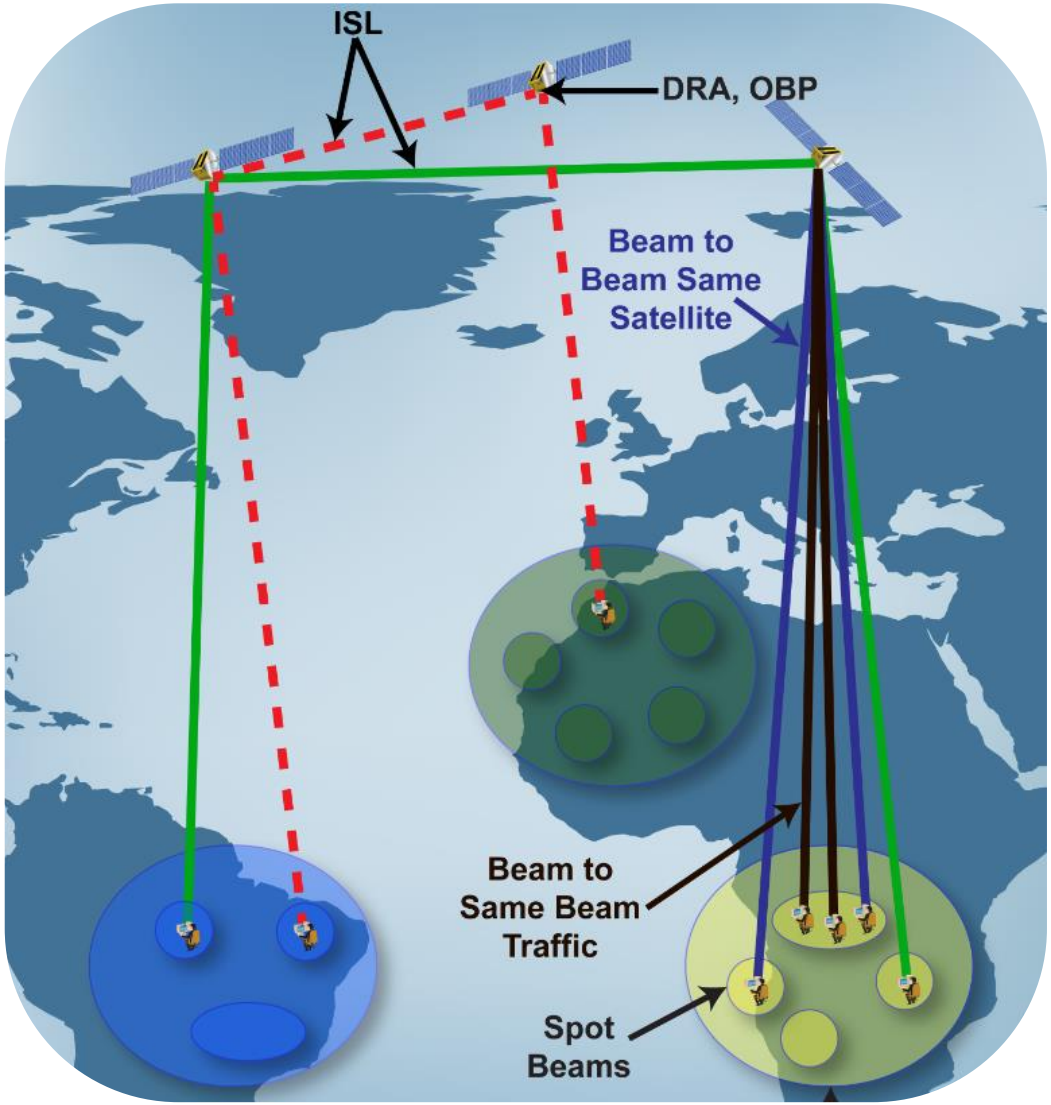
Sophisticated and Flexible Connectivity Enabled By Advanced Technologies

Key enabling technologies:

- Spot beams
- Inter-satellite communications: optical inter-satellite links (ISL), on-board processing (OBP)

System capabilities:

- Gbps links
- Tbps total useable system capacity



A New Level of Coverage Anywhere, All the Time

- Telesat's system will have the ability to connect from any point to any point and serve customers anywhere on the earth
  - Including underserved locations – maritime, aero, rural and remote, poles – where the satellite cannot see a hub
- It will also have the ability to focus capacity on areas of greatest demand and reallocate capacity as user demand changes
  - Inclined orbit focuses satellites over areas of highest demand
  - Location, number and size of the spot beams, as well as the amount of spectrum and power per beam, can be varied dynamically
  - Provides highly efficient utilization of spectrum and satellite resources

A New Level of Resiliency and Security

Telesat's LEO system ISLs and OBP will provide a level of resiliency and security not possible with GEO, terrestrial or other types of LEO networks – key requirement of U.S. military

- Highly secure global coverage – direct connectivity from any point to any point on earth
  - Able to connect any two points on the globe without having to go through intermediate networks
  - Completely diverse from other possible network connections between locations
- In-orbit satellite spares available for each "plane" of the constellation in case of catastrophic satellite failure
- Network auto-recovery/routing:
  - Each satellite and gateway/terminal is a "Node" in the network, such that traffic is automatically routed around a failure point in the network, similar to a ground-based network

- Physical security:
  - Customer-owned gateways (separate from commercial gateway facilities) can be deployed in secure facilities anywhere in the world to provide access to critical defense/government applications
- Enhanced capability to resist interference (intentional as well as unintentional)
  - Active beam forming
  - Regenerative payload

Critical issues with in-line event avoidance proposal

Regulatory

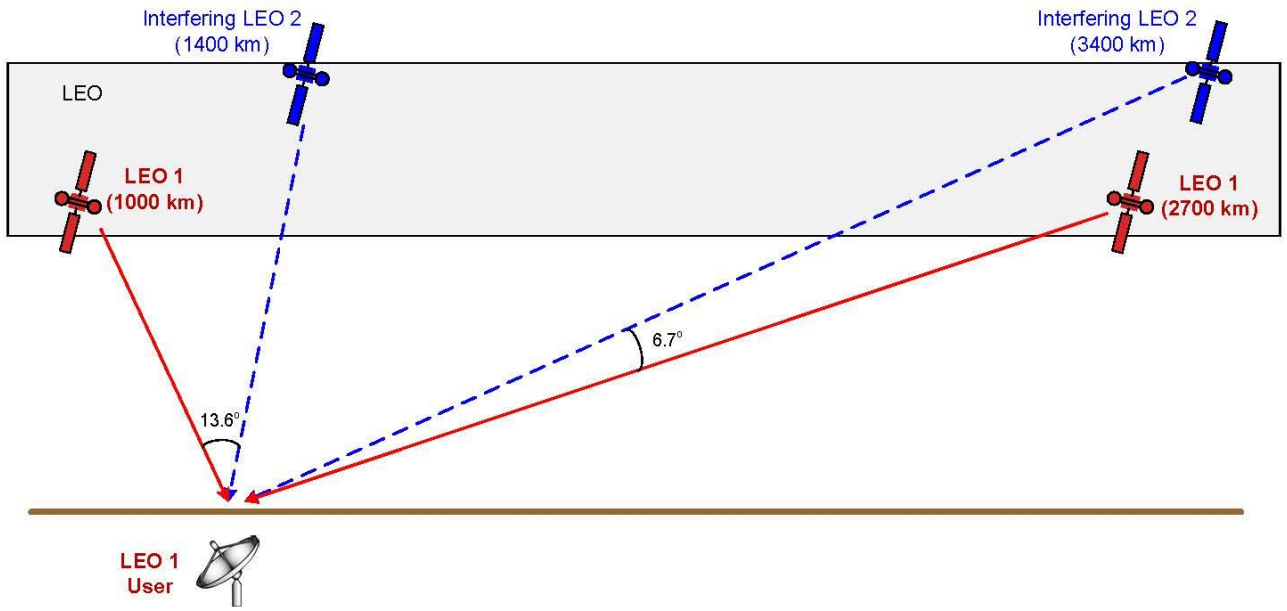
- Telesat Reply Comments in the FCC NGSO NPRM[1] makes the following points:
  - Avoidance Angle – There is no single avoidance angle that will adequately define in-line events and prevent interference
  - Share In-line Events – A “share in-line events” regime would be the functional equivalent of band segmentation due to the number and frequency of events

[1]Update to Parts 2 and 25 Concerning Non-Geostationary, Fixed-Satellite Service Systems and Related Matters, Notice of Proposed Rulemaking, IB Docket No. 16-408, FCC 16-170 (rel. Dec. 15, 2016)

Avoidance Angle

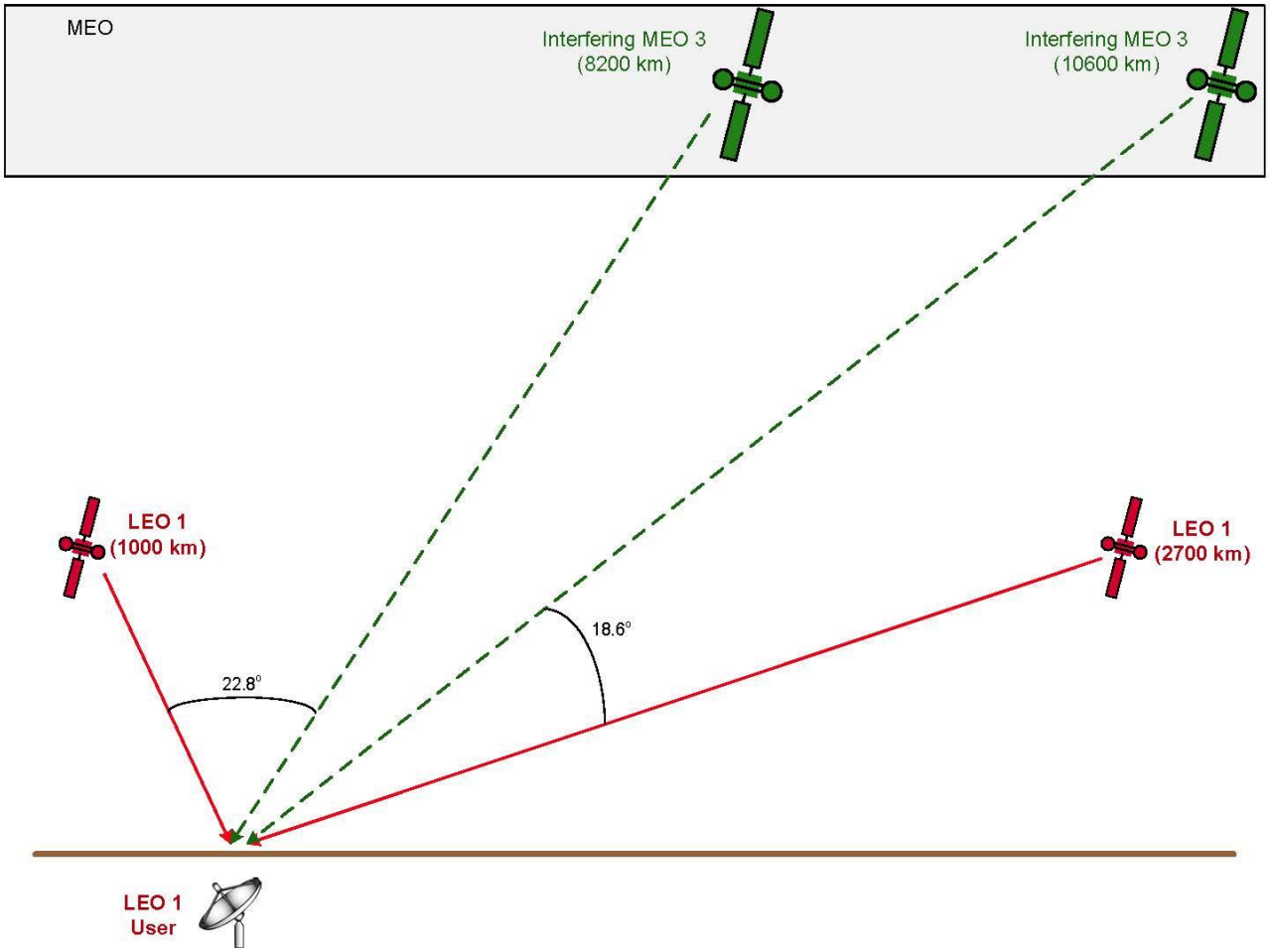
- The avoidance angle between two systems varies depending on elevation angle

- In this example, taking into account a maximum interfering power from LEO 2, the avoidance angle to LEO 1 ranges from 6.7º to 13.6º



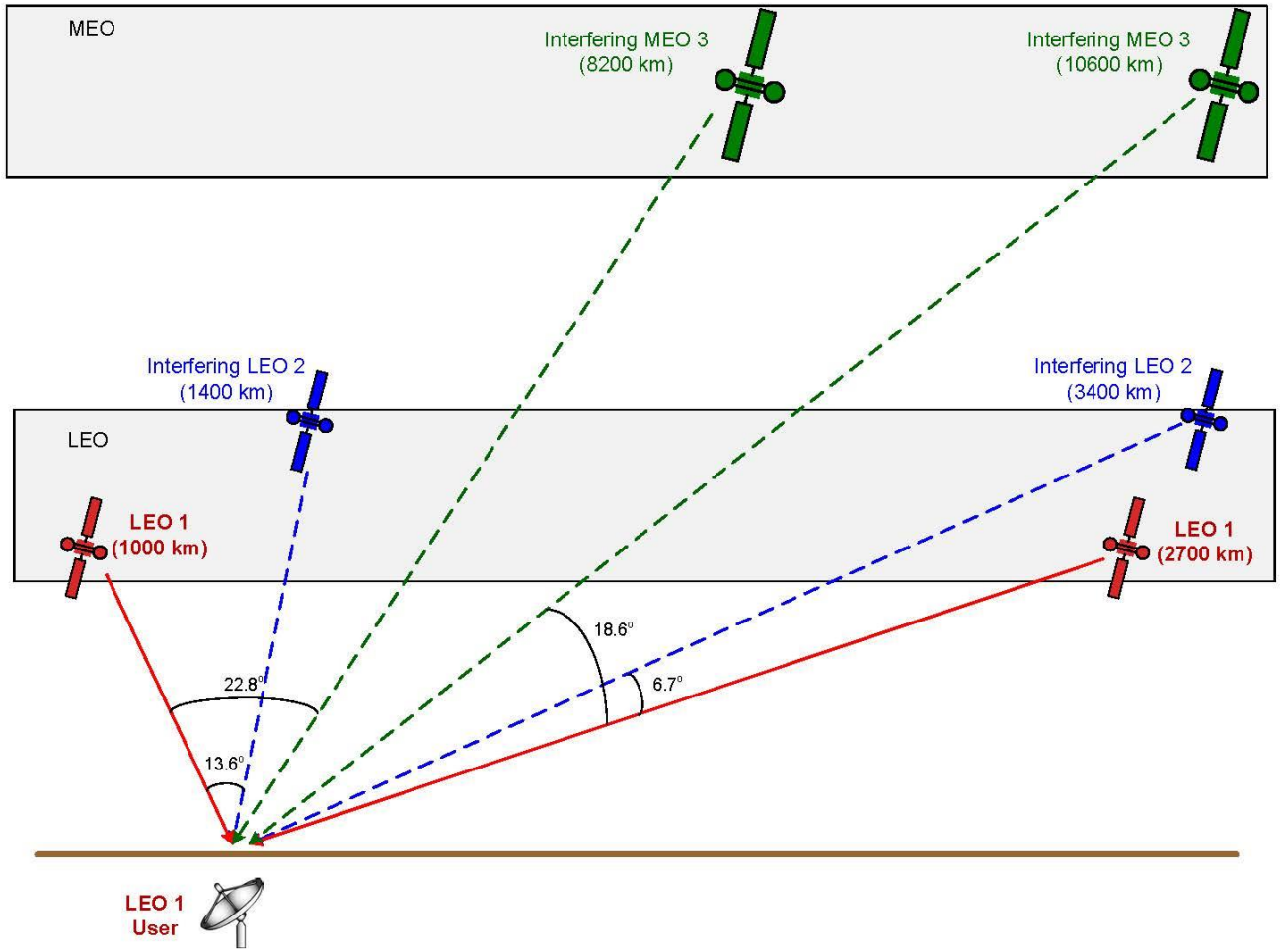
Avoidance Angle, con't

- In this example, taking into account a maximum interfering power from MEO 3, the avoidance angle to LEO 1 ranges from 18.6^{o} to 22.6^{o}



Avoidance Angle, con't

- This illustrates the avoidance angle to LEO 1 ranges from 6.7º to 22.6º depending on the interfering system (LEO 2 or MEO 3)
- Other systems will require other avoidance angles depending on system characteristics such as maximum power and minimum elevation angle



In-Line Event Analysis

- Telesat used an industry standard software to simulate the interference to the Viasat 24 satellite MEO constellation from the Boeing 2,956 satellite LEO constellation, and from a combination of the Boeing 2,956 LEO constellation and the OneWeb 720 satellite LEO constellation
- Results vary by latitude and indicate the percentage of time per day where an in-line event would occur ranges from approximately 40% to 100%