

FSS-4180-LP



L-3 Communications Proprietary

Contents cannot be disclosed without prior written consent from T&I.



Features and Benefits of the L-3 Communications FSS-4180-LP

Feature	Benefit
Lower Overall Height (<16" from top of radome to mounting surface)	Lower visual signature. No need to remove from most vehicles for C-130 loading
Lower Weight – < 80 lbs above deck. (including antenna, RFE, Radome)	Simpler integration to the vehicle. No major structural modifications necessary
Low Power Consumption < 400 watts continuous including the power amplifier	No modifications necessary on the vehicle power generation
Lower Cost	> 20% reduction from the FSS-4180
Higher Dynamics	Delivers 100% Availability over all terrain at satellite look angles up to 70 deg
Balanced loads in both axes make the FSS-4180-LP impervious to lateral accelerations	Low profile unbalanced antennas are susceptible to lateral accelerations leading to poor performance or skipped steps if stepper motor driven
Designed for Military Environments; Rugged Construction	Operates in harshest environments and assures long life of product

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FSS-4180-LP Technical Specifications

SPECIFICATION	LEVEL
Frequency	RF Rx- 10.95 to 12.75 GHz Tx- 14.0 to 14.5 GHz IF Rx – 950 to 2150 MHz Tx – 950 to 1450 MHz
G/T	Greater than 12 dB/k at 10.95 GHz from 10 to 90 degrees elevation, 23 deg C, radome included.
Tx Gain	Greater than 31.0 dBi from 10-90 degrees elevation angle at the rotary joint input port (output from the SSPA) at 14.25 GHz, radome and pointing loss included
EIRP	Greater than 45.0 dBW with 25W SSPA incl pointing error
Beamwidth	Rx – 4.4 x 3.3 degrees nominal Tx – 3.6 x 2.7 degrees nominal
Polarization	Rx – Steered Linear H/V Tx – Orthogonal Steered Linear H/V (Polarization Automatically Steered) > 15 dB cross polarization isolation under all dynamic conditions.

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FSS-4180-LP Technical Specifications

SPECIFICATION	LEVEL
Velocity	AZ – 1000 deg/s EL – 1000 deg/s Pol – 1000 deg/s
Acceleration	AZ – 600 deg/s ² EL – 2000 deg/s ² Pol – 2000 deg/s ²
Coverage	AZ – Continuous EL – -5 to 90 deg Cross-Pol - +/- 165 deg
Pointing Error	Less than < 1dB. (about 0.9 degrees)
Power	Peak at 650 watts with continuous at 420 watts, 28VDC for antenna and RF Electronics.
Size	21” Radome Diameter X 16” Tall, incl optional baseplate
Antenna Weight	< 122-lbs for the antenna, radome, baseplate and RF Electronics, Cabling dependent on lengths. Does not include ACU or IRU.
Controller Weight	< 10-lbs
MTBF	Estimated at 7000 hrs

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Plug and Play Demonstrator Configuration

COTM FSS-4180-LP

WEIGHT ESTIMATES:

POSITIONER:	35 LBS
RFE:	20 LBS
ADAPTER PLATE:	37 LBS
INU:	8 LBS
INTERFACE PLATE:	13 LBS
BRUSH GUARDS:	11 LBS
<u>RADOME:</u>	<u>6 LBS</u>
TOTAL:	130 LBS

OVERALL DIMENSIONS:

16.5" HIGH 23.5" WIDE
48.0" LONG

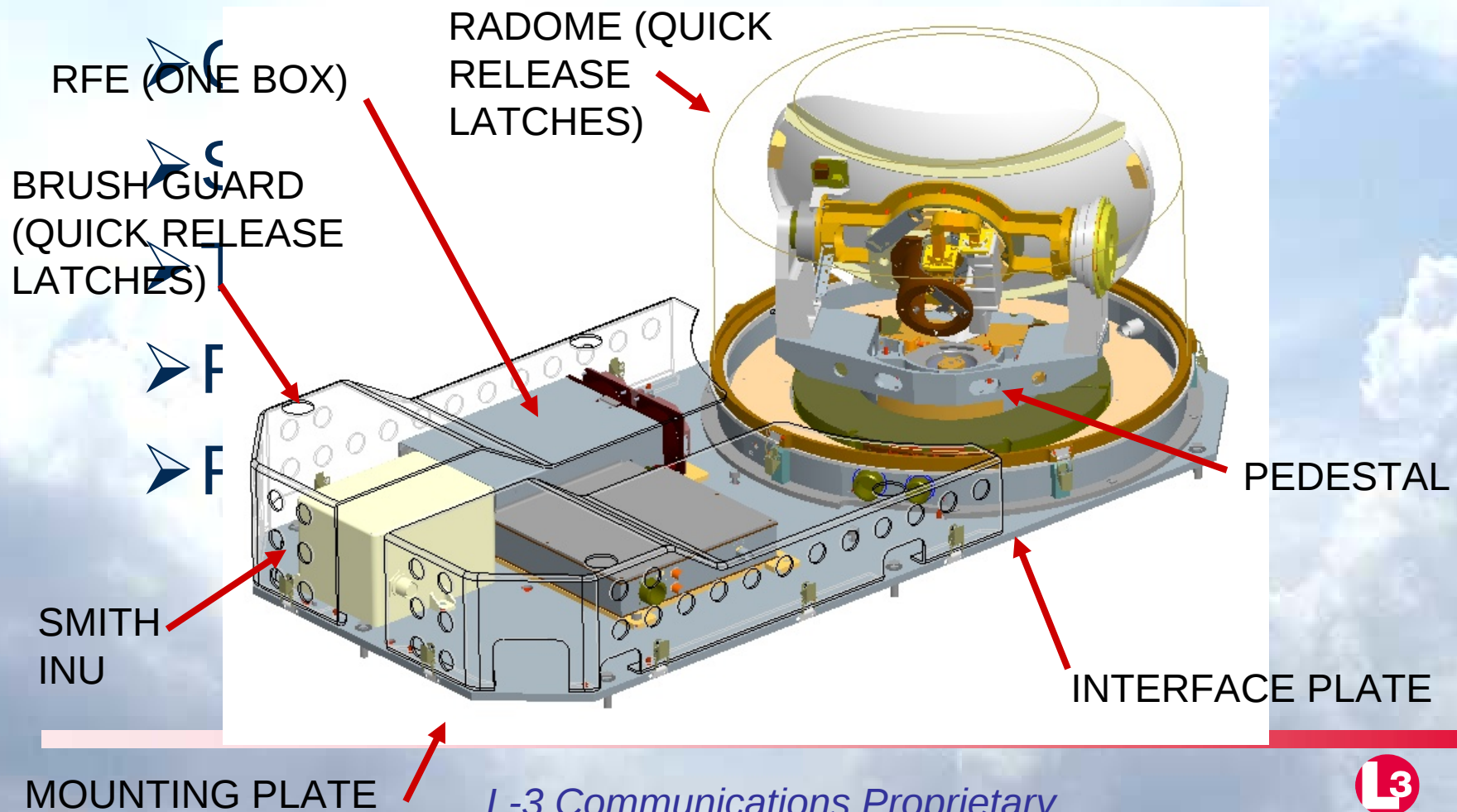


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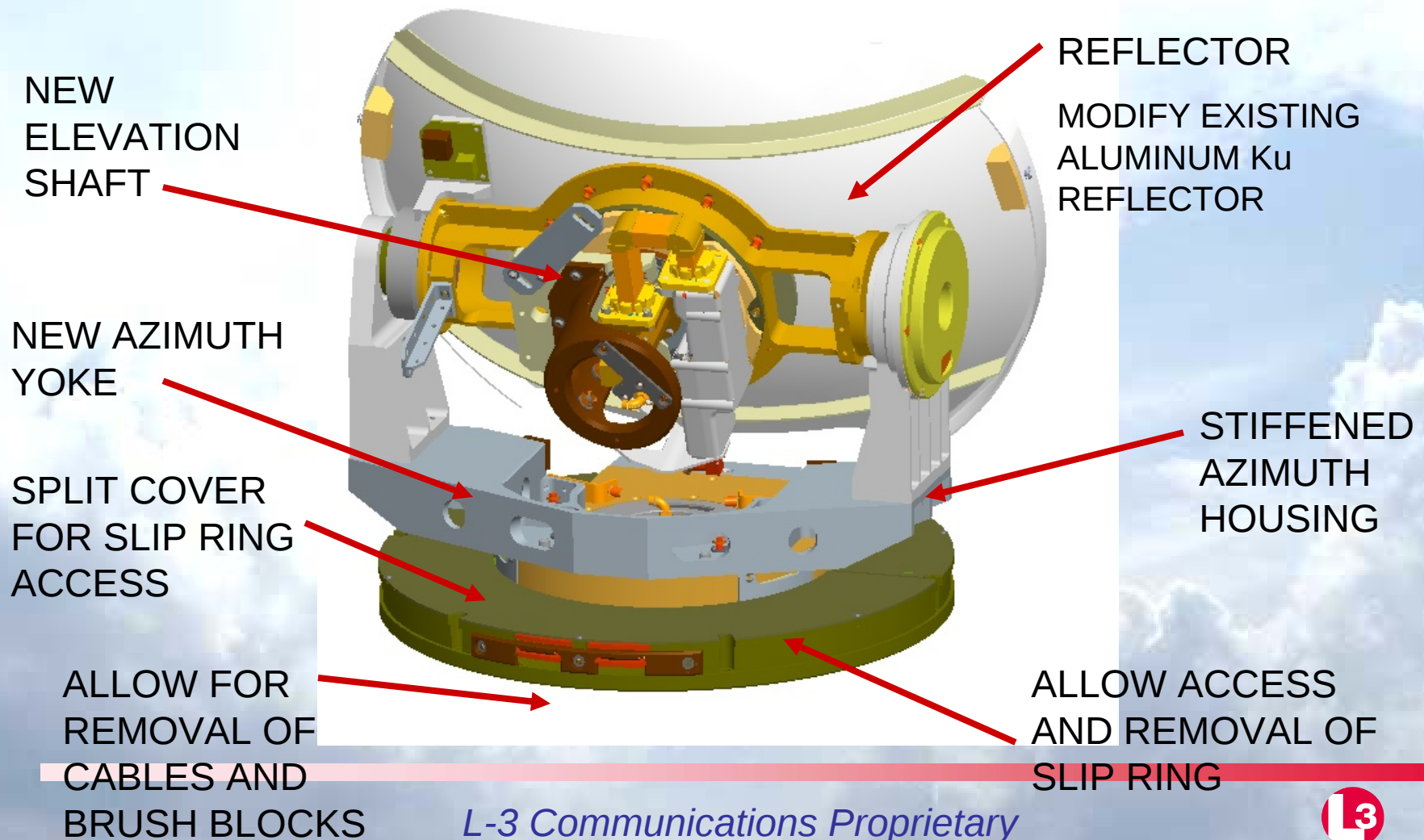
FSS-4180-LP Mechanical Details



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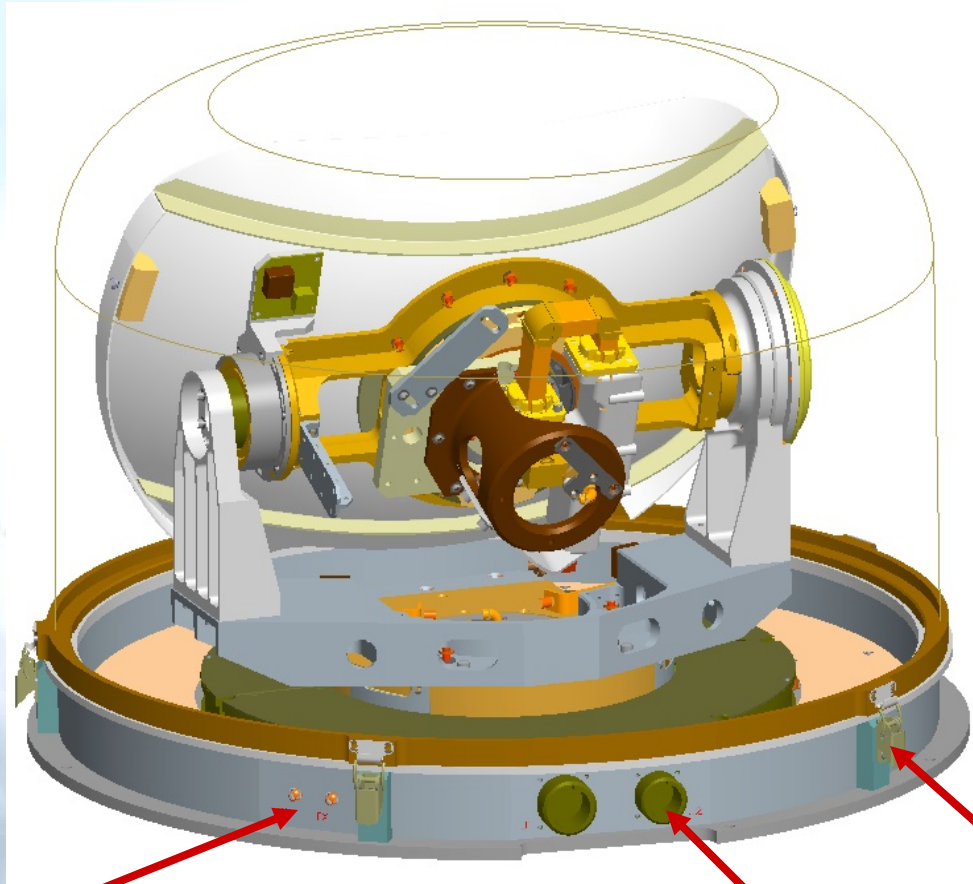
PEDESTAL DESIGN 2-AXIS & POLARIZER



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PEDESTAL-RADOME-INTERFACE PLATE



FEATURES:

- 16.5" HIGH
- 23.5" DIAMETER
- FULLY ENCLOSED
- INTEGRATED ANTENNA CONNECTORS
- INTEGRATED RF CONNECTIONS
- INTEGRATED BREATHER VALVE AND DESICCANT

TX (SMA-OSM)

RX (SMA-OSM)

WALL MOUNT
PEDESTAL
CONNECTORS

DRAW LATCHES 5
PLACES

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Various Views of the FSS-4180-LP



**Size Comparison
between the FSS-4180
and the FSS-4180-LP**

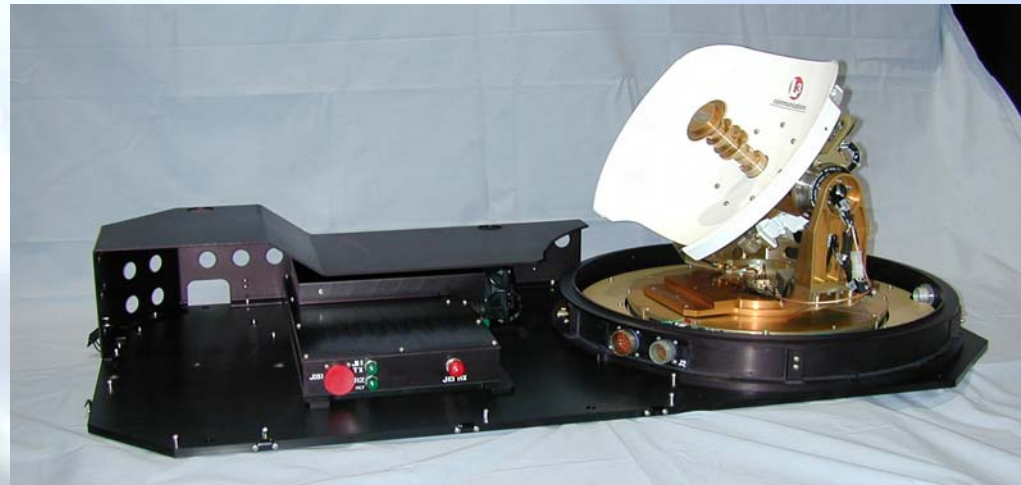
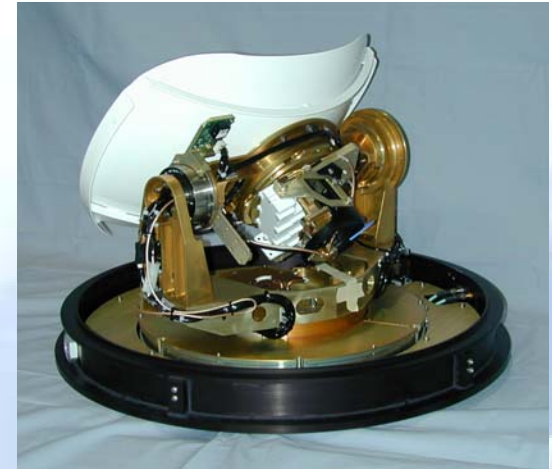
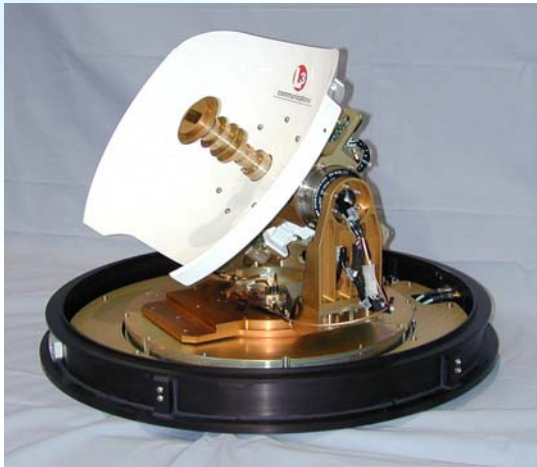


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Various Views of the FSS-4180-LP



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Dynamic Performance and Why It's Important

- Gimbal dynamics impact system performance from two aspects: ability to accurately point at the satellite, and the ability to accurately position the polarization angle (which impacts polarization isolation).
- Through simulations we ran percentage availability calculations on three terminal types for the Stryker vehicle with the Perryman Course.

	Mount Velocity Capabilities	Mount Acceleration Capabilities	% Availability (does not exceed 1 dB pointing loss) (at 30 degrees elevation).
Low Performance Antenna 1	50 degrees/second	100 degrees/second ²	55%
Mid-Performance Antenna 2	100 degrees/second	200 degrees/second ²	85%
High Performance Datron Antennas	1000 degrees/second	> 600 degrees/second ²	100%

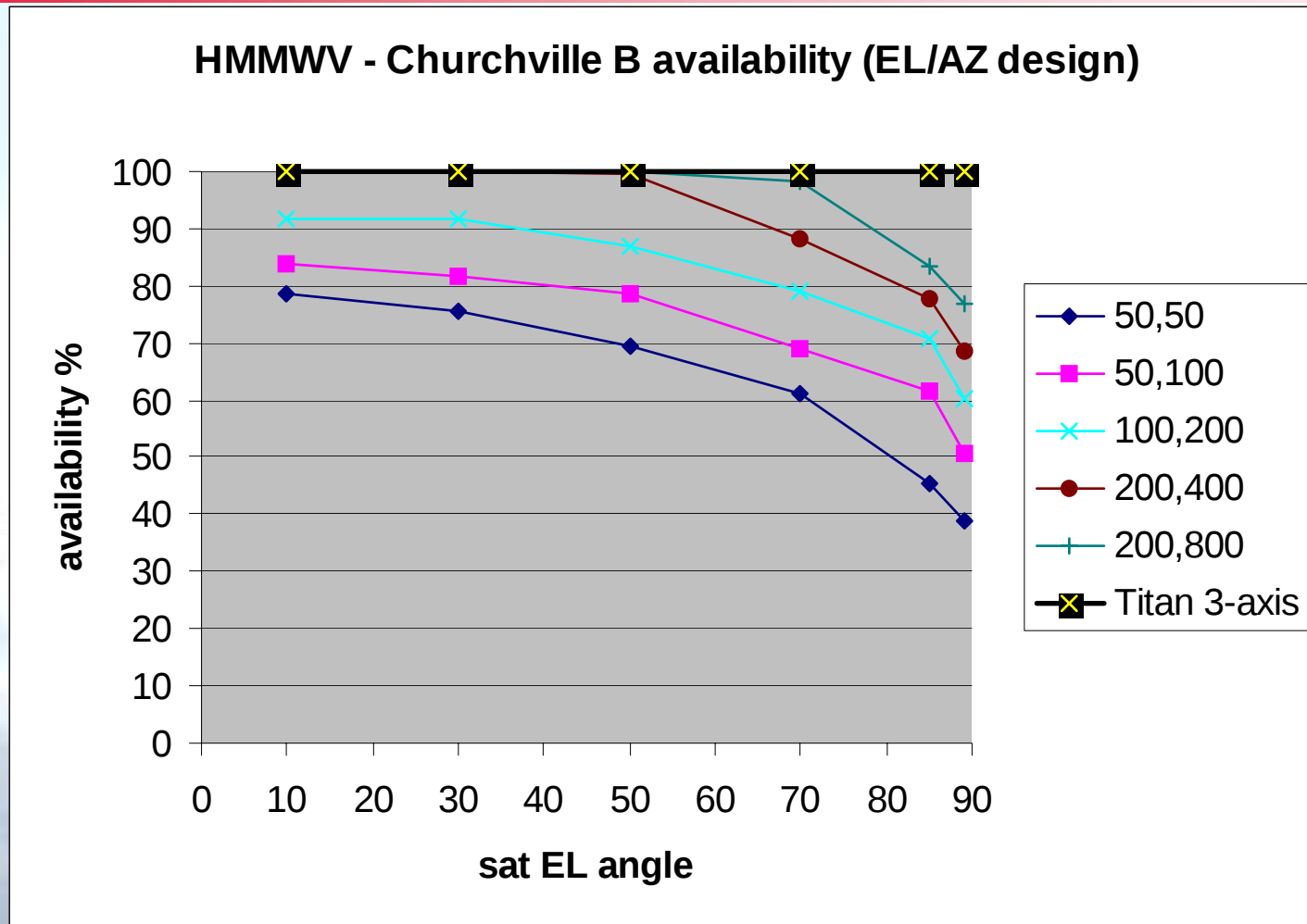
- The low-performance antenna produces unacceptably large dropouts in which communications cannot take place and the uplink must be shut off to ensure no interference.
- The mid-performance still suffers from long outages and variations in power density because of it.
- From a network perspective antennas 1 and 2 will prevent the network from being optimized and one ends up wasting bandwidth.

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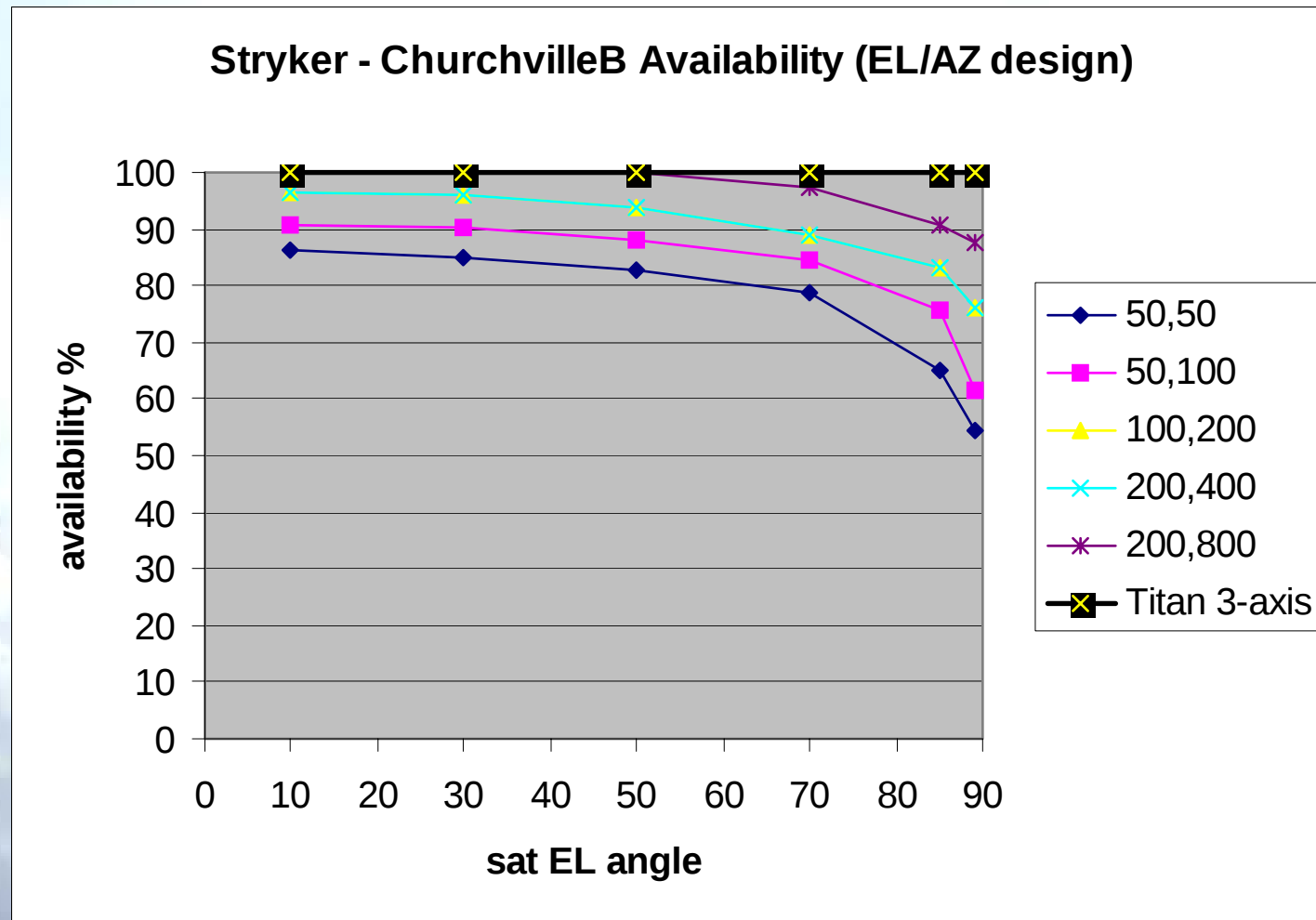
Percentage Availability Based on Course and Vehicle



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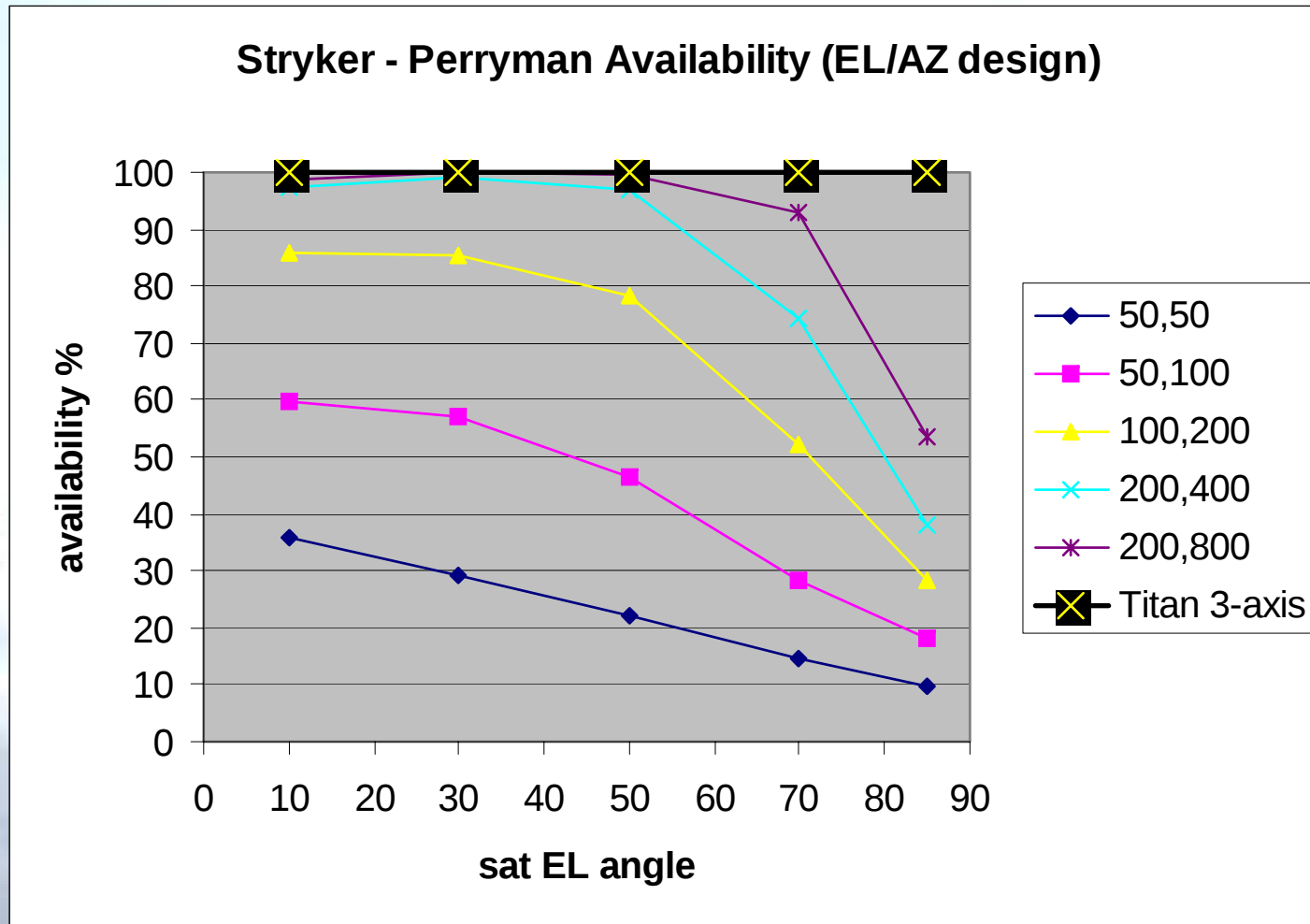
Percentage Availability Based on Course and Vehicle



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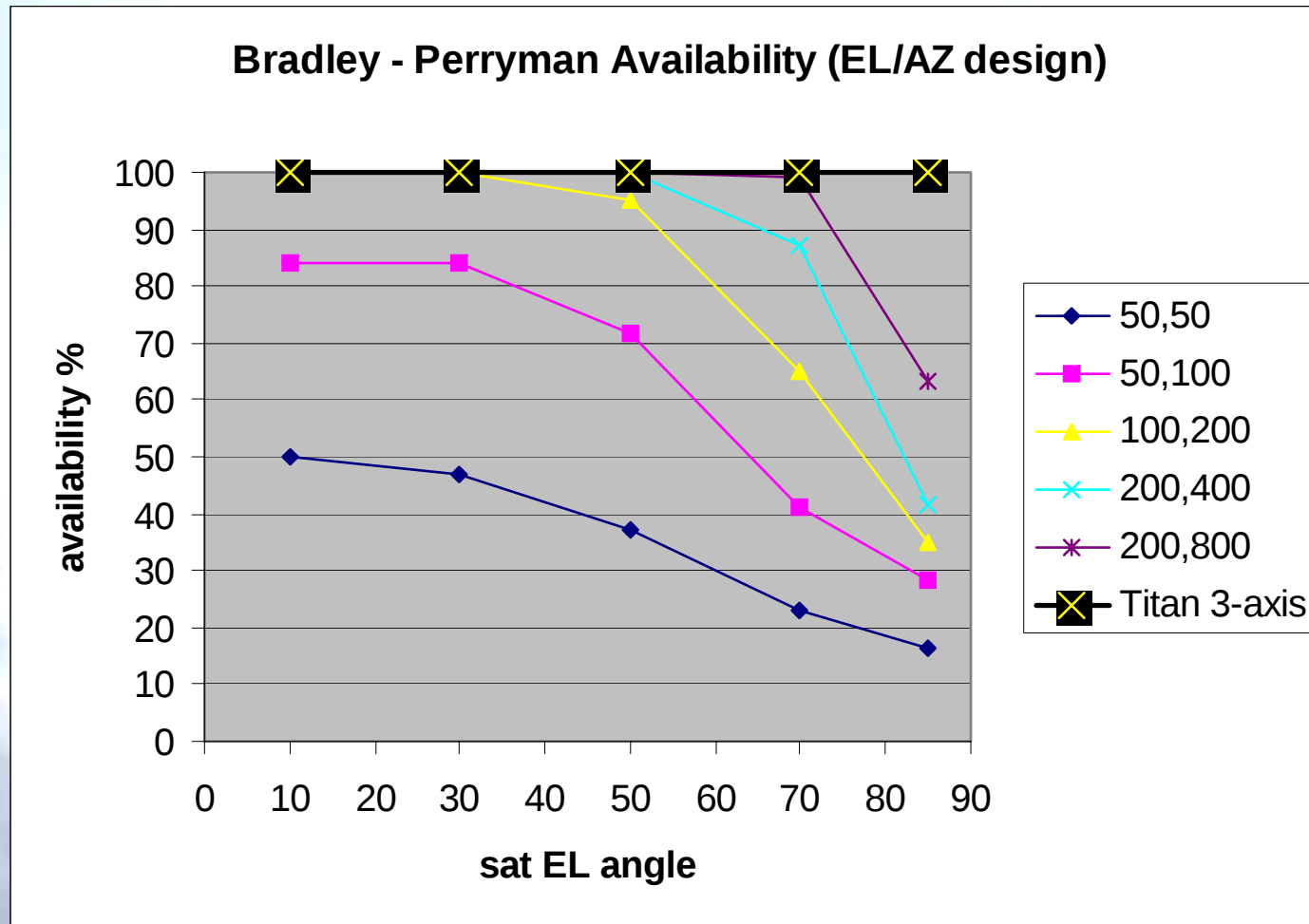
Percentage Availability Based on Course and Vehicle



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Percentage Availability Based on Course and Vehicle



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Dynamic Performance and Why It's Important

- *The market for COTM terminals is new.*
- *Utilizing a low performance antenna system has the potential to create a bad first impression.*
- *The L-3 Communications design provides unsurpassed performance over the full hemisphere of operation for any deployment area in the world any observable satellite.*
- *The L-3 Communications 2 axis gimbal provides equivalent performance up to a 70 deg elevation look angle which is the majority of all deployable land areas and Ku-Band satellites.*
- **Conclusion – High velocities, and accelerations are necessary for availabilities greater than 90%.**

Percentage Availability as a Function of Gimbal Rates

➤ Assumptions:

- *Availability is defined as providing less than 1 dB of pointing loss.*
- *Antenna is Ku Band and 13.5" x 18" in diameter.*
- *Satellite source is 45 degrees off the front of the vehicle.*
- *For purposes of comparison the gimbals are two axis designs. Our antenna is three axis and provides no degradation at the higher elevation angles.*
- *Degradation of cross-polarization is not included in the availability calculation. In reality if this were included it would degrade the link even further.*