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AstroMesh™ Reflector Parametrics

Evolution of AstroMesh Family

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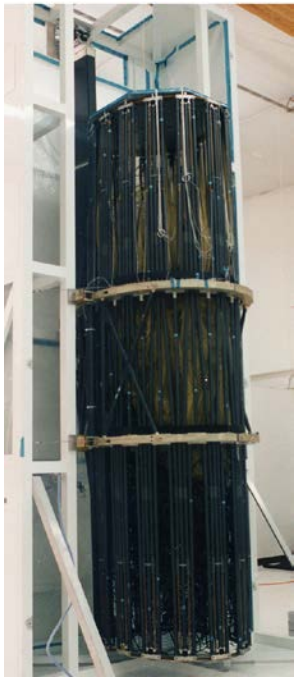
- AstroMesh hardware designs for a broad spectrum of applications
  - **Aperture sizes from 3 to greater than 50-meter**
  - **Frequency range UHF to beyond Ka-Band**

AM
12-Meter



Reduce Stowed Diameter by 40%

AM-1
6 to 25-Meter Class

Reduce Reflector Mass by 50%

AM-Lite
3 to 8-Meter Class

Reduce Stowed Height by 40%

AM-2
18 to 50-Meter Class

Comparison of AstroMesh Stowed Packages 12-Meter Deployed Aperture

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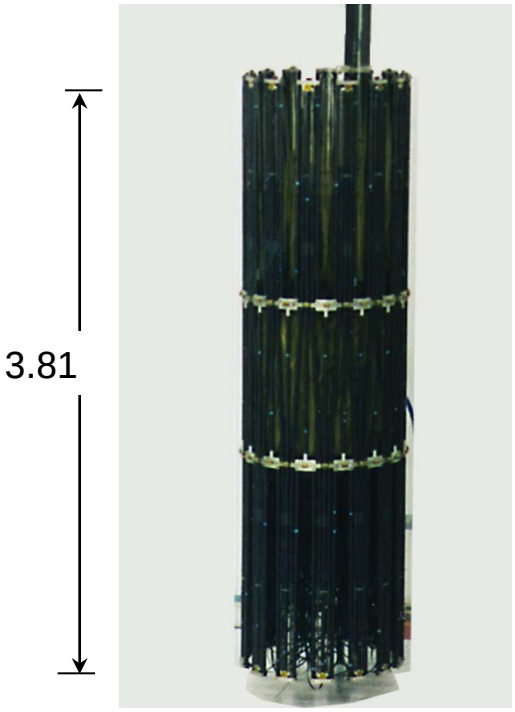
AM

1st Generation Thuraya Configuration Mounted to Spacecraft Top Deck

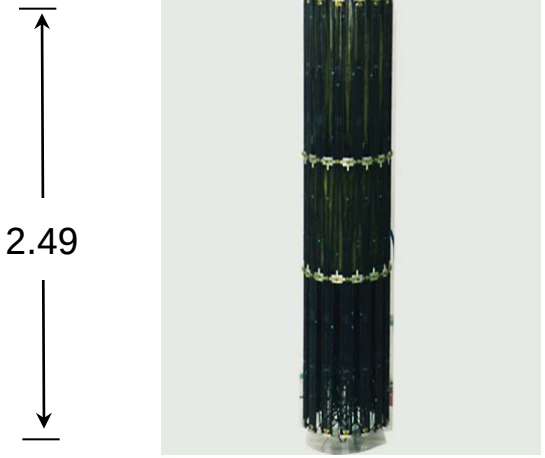


AM-1

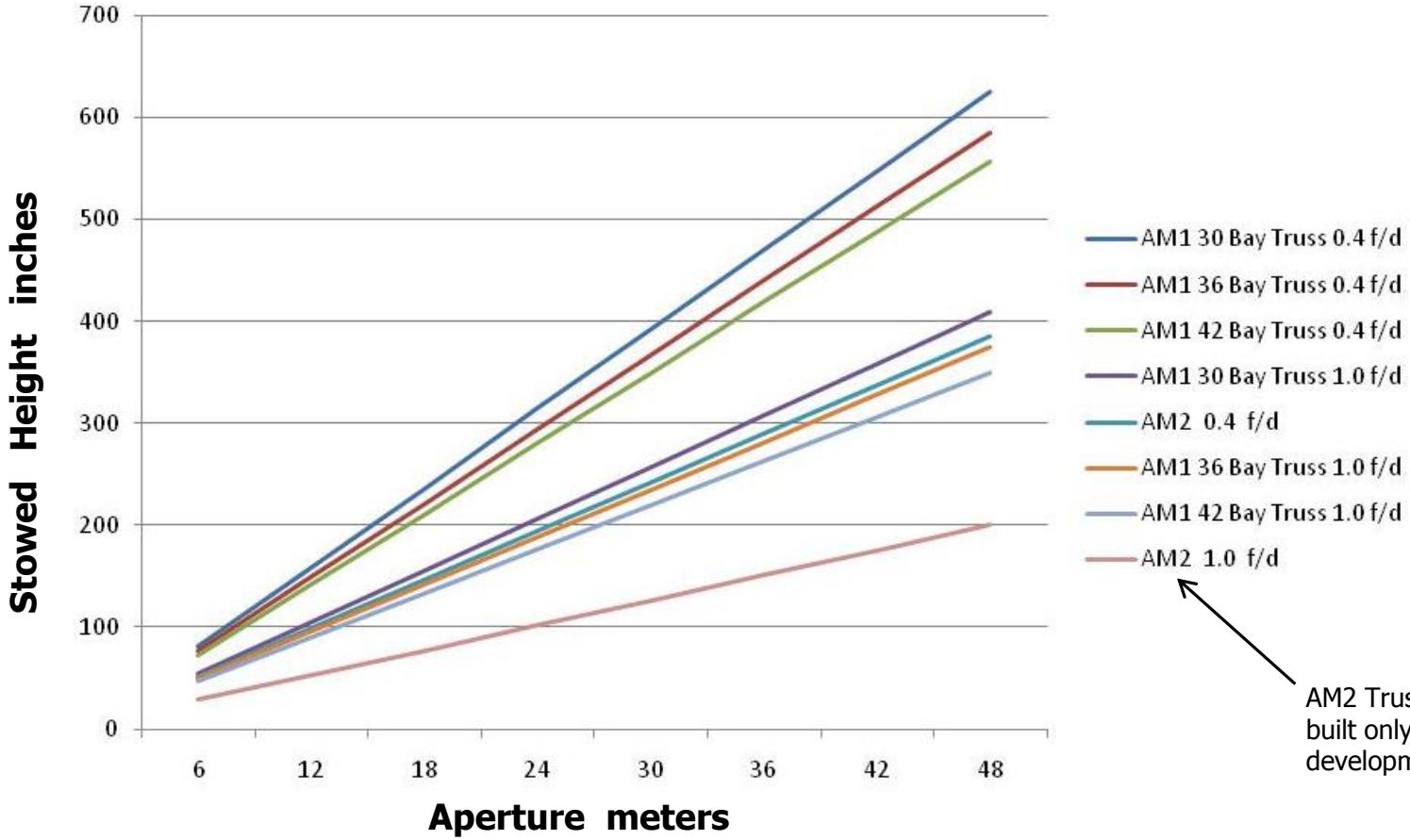
Tighter Stowed Package to Enable Mounting on Spacecraft Sidewall
6 to 25-m Class

AM-2

Redesigned Truss Articulation Reduces Stowed Height
18 to 50-m Class



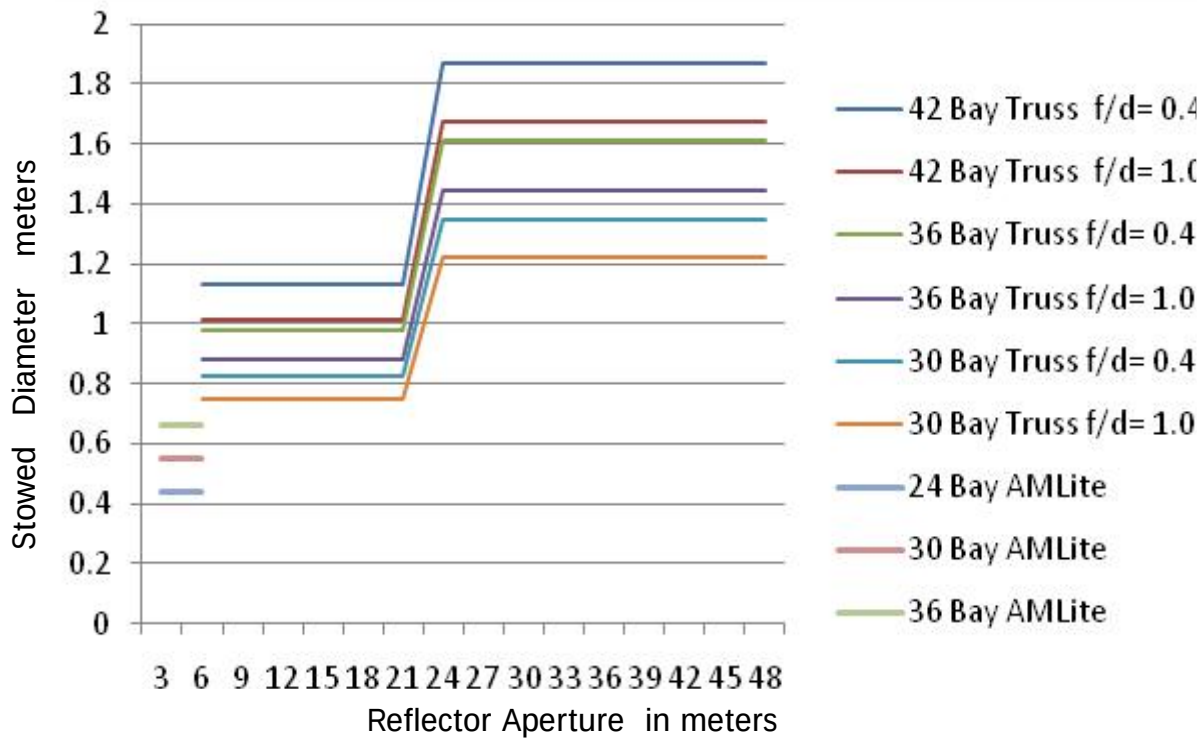
Reflector Stowed Package Height



- **Increased F/D reduces stowed package height**
- **Increased number of rim truss bays reduces stowed height**
- **AMLite stowed package height is the same as AM1**

Approved for Public Release - Clearance Request Case # 14-1014

Maximum Stowed Diameter



- **Past developments have established standard ranges of reflector packaging**
  - **These are not optimized but minimize NRE**
- **In the AM-1 range,**
  - **reduced f/d increases ellipticity – reduces minimum diameter and increases maximum diameter**
  - **Increased bay count in the truss reduces stowed height but increases diameter**
- **The AM-Lite version produces a round – not elliptical - package.**
- **Reflectors with higher accuracy requirements (= or> Ka-Band) require larger packages (see next chart)**

Achieving Surface Accuracy Requirements

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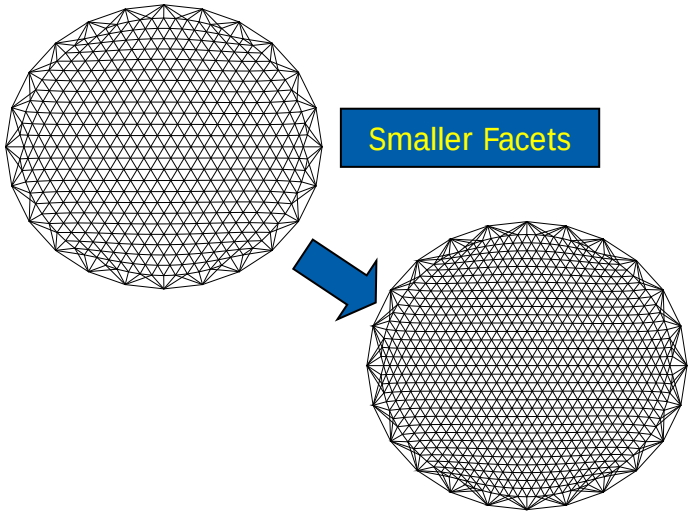
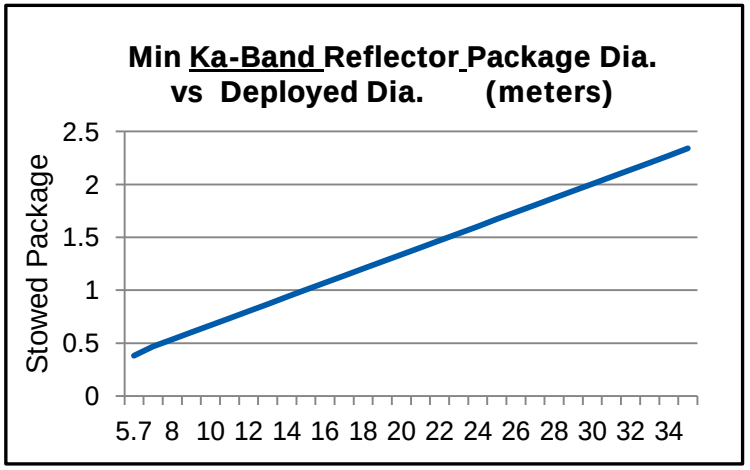
Surface Accuracy Increase is Achieved by The Following Methods:

- **Increase mesh support network density**
  - Smaller facets
  - Can require increase in stowed package diameter





Reflector Mesh Reflectivity

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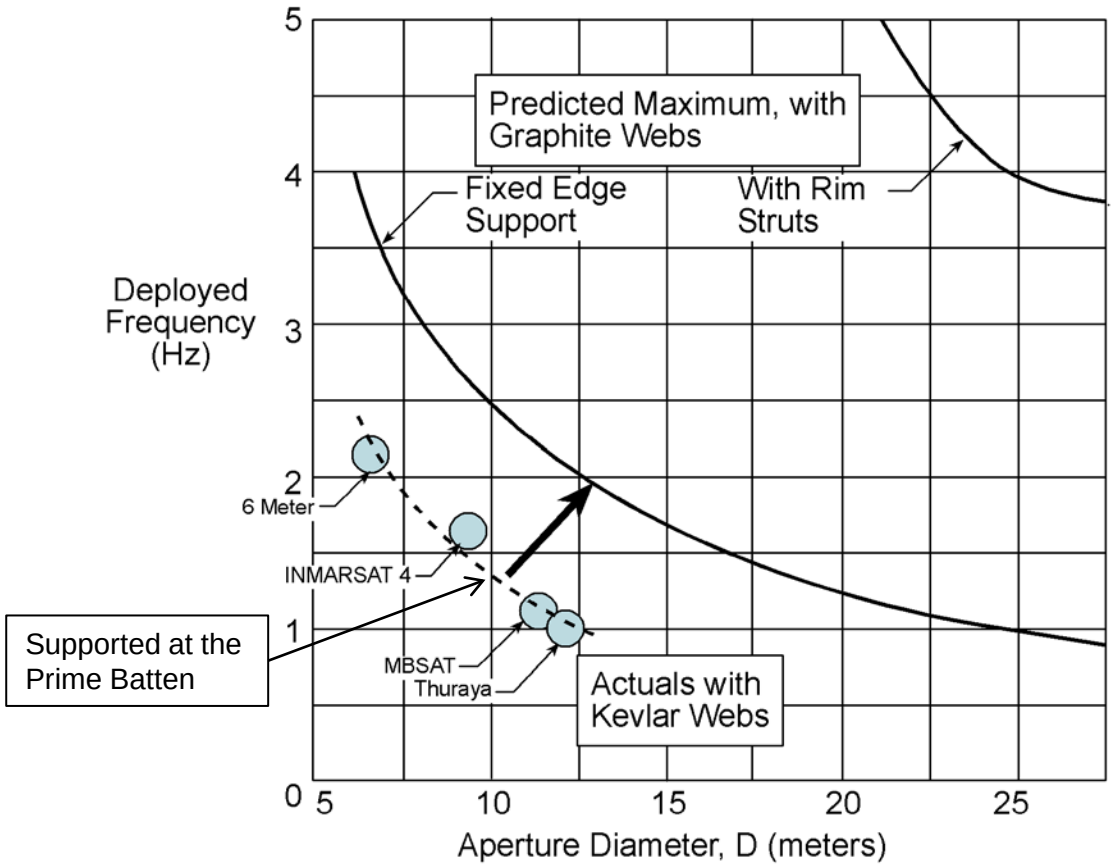
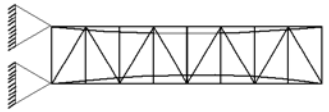
- **FEM analysis and test results correlate**
- **Principal and cross-pol reflectivity tests show no significant difference**

Mesh Transmission Loss dB							
Knit Density	Frequency GHz						
	1.5	10	20	30	40	50	60
10 opi	-0.05	-0.32					
20 opi		-0.06	-0.24	-0.51			
40 opi			-0.04	-0.14	-0.021	-0.035	-0.05

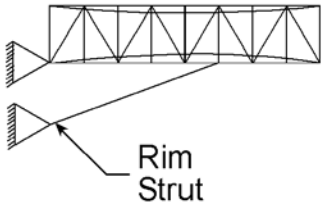
Deployed Natural Frequency, First Mode (Reflector only)



- Fixed edge support



- Rim support struts increase frequency 4x



- Please note that the frequencies shown are ideal, actual frequencies are dependent on spacecraft boom and structure compliance

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