

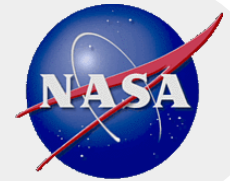
**AI23.3, AI25.1, AI 28.1  
(International 24h LEO space  
debris measurement campaign  
2006, 2008, 2010)**

**30<sup>th</sup> IADC Meeting  
Montreal, Canada  
2012**



## Action Item Status

- **AI 23.3 – 2006 International 24h LEO space debris measurement campaign**
  - Lead author – Gene Stansbery
  - Participating Sensors - FGAN/TIRA, EISCAT, Haystack, HAX, Cobra Dane
  - Status
    - Submitted to WG1 in December 2011
    - Submitted to Steering Group January 2012
- **AI25.1 – 2008 International 24h LEO space debris measurement campaign**
  - Lead author – Gene Stansbery
  - Participating Sensors - FGAN/TIRA, Haystack, HAX, Cobra Dane
  - Status
    - Missing 2 hours of Cobra Dane data on UCT sizes
    - Proceeding without missing data
    - Draft report ~50% complete
- **AI28.1 – 2010 International 24h LEO space debris measurement campaign**
  - Lead author – Tim Payne
  - Participating Sensors - FGAN/TIRA, Haystack, HAX, Cobra Dane
  - Status
    - Awaiting Data



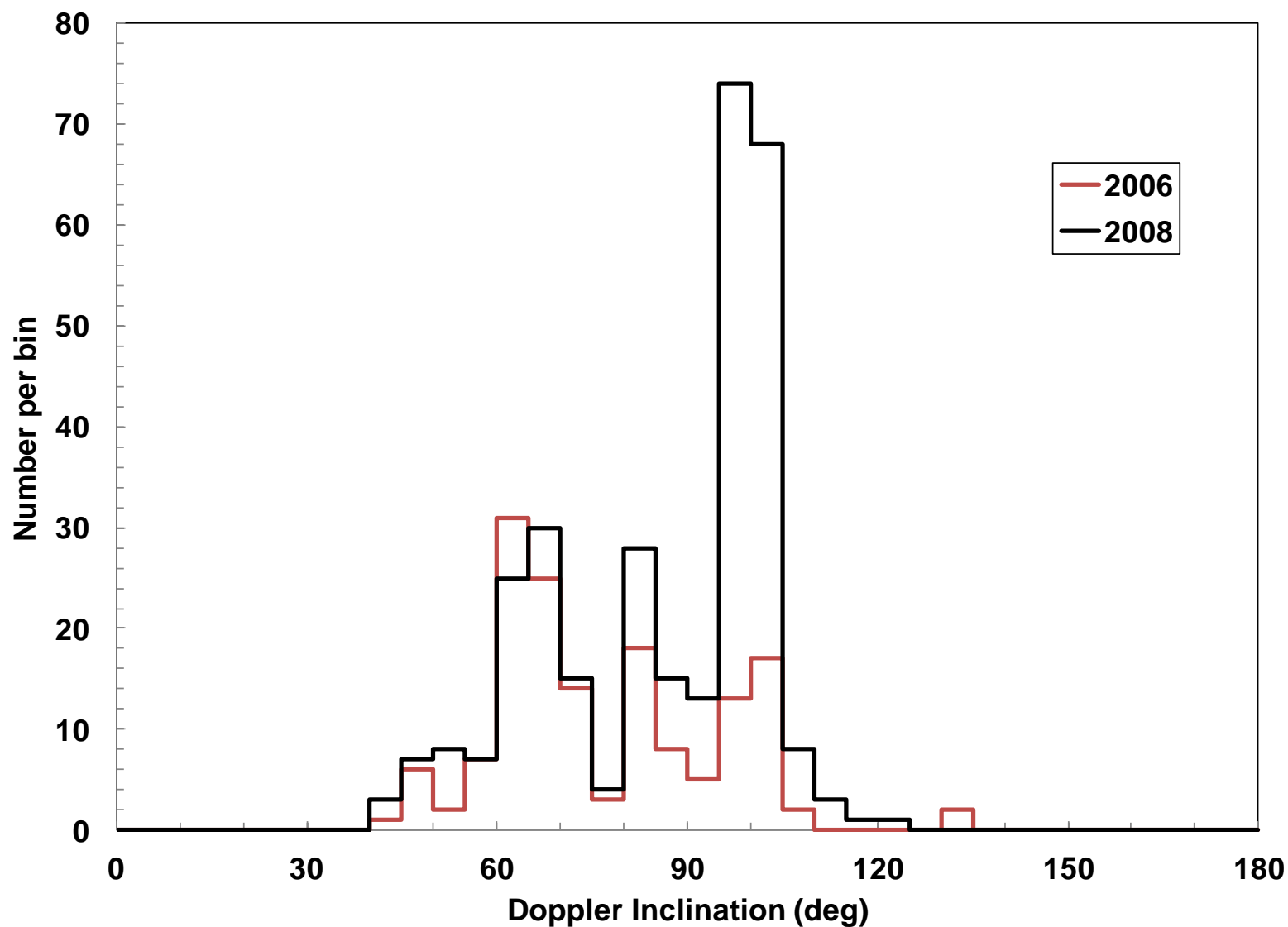
# Breakups Between 2006 & 2008 Campaigns

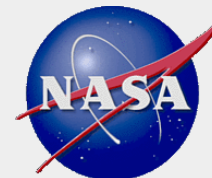
SATELLITE NAME	INT'L DESIG	SATELLITE TYPE	DRY MASS (KG)	BREAKUP DATE	Fragments Cataloged*	Number Still in Orbit*	APOGEE (KM)	PERIGEE (KM)	INCL (DEG)	ASSESSED CAUSE	ADDITIONAL INFORMATION
ALOS-1 R/B	2006-002B	R/B	~3000	8-Aug-06	21	0	700	550	98.2	UNKNOWN	H-IIA SECOND STAGE
COSMOS 2371 ULLAGE MOTOR	2000-036E	OP DEB	55	~1-Sep-06	0	0	21320	220	46.9	PROPULSION	PROTON-K BLOCK DM SOZ
DMSP 5D-3 F17 R/B	2006-050B	R/B	2850	4-Nov-06	63	58	865	830	98.8	UNKNOWN	DELTA IV SECOND STAGE
COSMOS 2423	2006-039A	PAYLOAD	~6000	17-Nov-06	30	0	285	200	64.9	DELIBERATE	SELF-DESTRUCT
COBE R/B	1989-089B	R/B	920	3-Dec-06	25	0	790	685	97.1	UNKNOWN	DELTA SECOND STAGE
IGS 3A R/B	2006-037B	R/B	~3000	28-Dec-06	12	0	490	430	97.2	UNKNOWN	H-IIA SECOND STAGE
FENGYUN 1C	1999-025A	PAYLOAD	950	11-Jan-07	2381	2340	865	845	98.6	DELIBERATE	HYPERVELOCITY IMPACT
BEIDOU 1D R/B	2007-003B	R/B	2740	2-Feb-07	3	1	41900	235	25.0	UNKNOWN	CZ-3A FINAL STAGE
KUPON ULLAGE MOTOR	1997-070F	OP DEB	55	14-Feb-07	3	3	14160	260	46.6	PROPULSION	PROTON-K BLOCK DM SOZ
CBERS 1	1999-057A	PAYLOAD	1450	18-Feb-07	66	60	780	770	98.2	UNKNOWN	
ARABSAT 4 BRIZ-M R/B	2006-006B	R/B	2600	19-Feb-07	36	34	14705	495	51.5	PROPULSION	PROTON-K BRIZ-M STAGE
USA 197 R/B	2007-054B	R/B	2850	11-Nov-07	31	31	1575	220	29.0	UNKNOWN	DELTA IV SECOND STAGE
USA 193	2006-057A	PAYLOAD	2275	21-Feb-08	174	0	255	245	58.5	DELIBERATE	HYPERVELOCITY IMPACT
COSMOS 2421	2006-026A	PAYLOAD	3000	14-Mar-08	481	131	420	400	65.0	UNKNOWN	COSMOS 699 CLASS
COSMOS 1818	1987-011A	PAYLOAD	2500?	4-Jul-08	0	0	800	775	65.0	UNKNOWN	

\*From November 4, 2008 US Space Surveillance Network Catalog

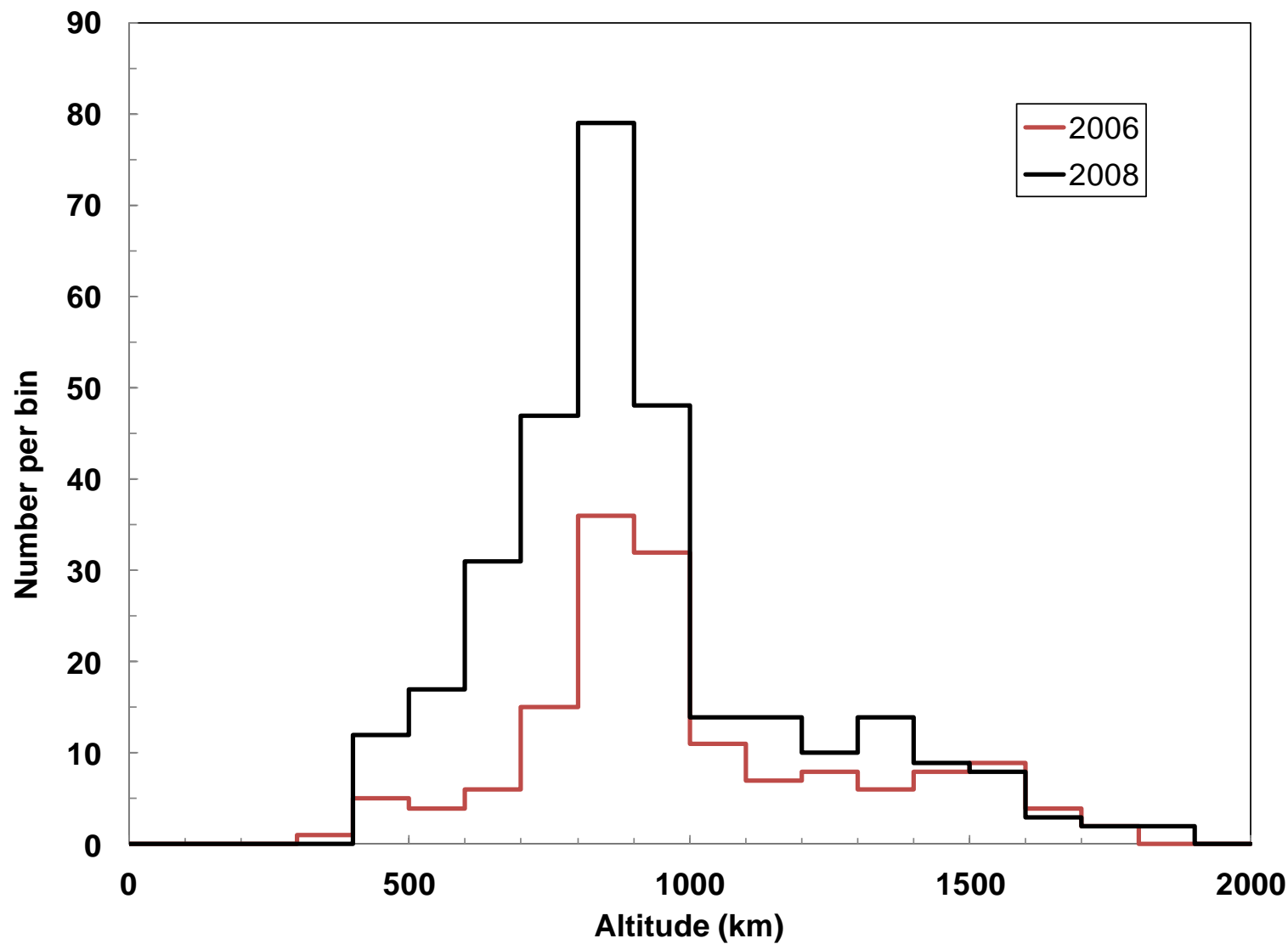


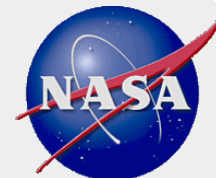
# Haystack Inclination Distribution



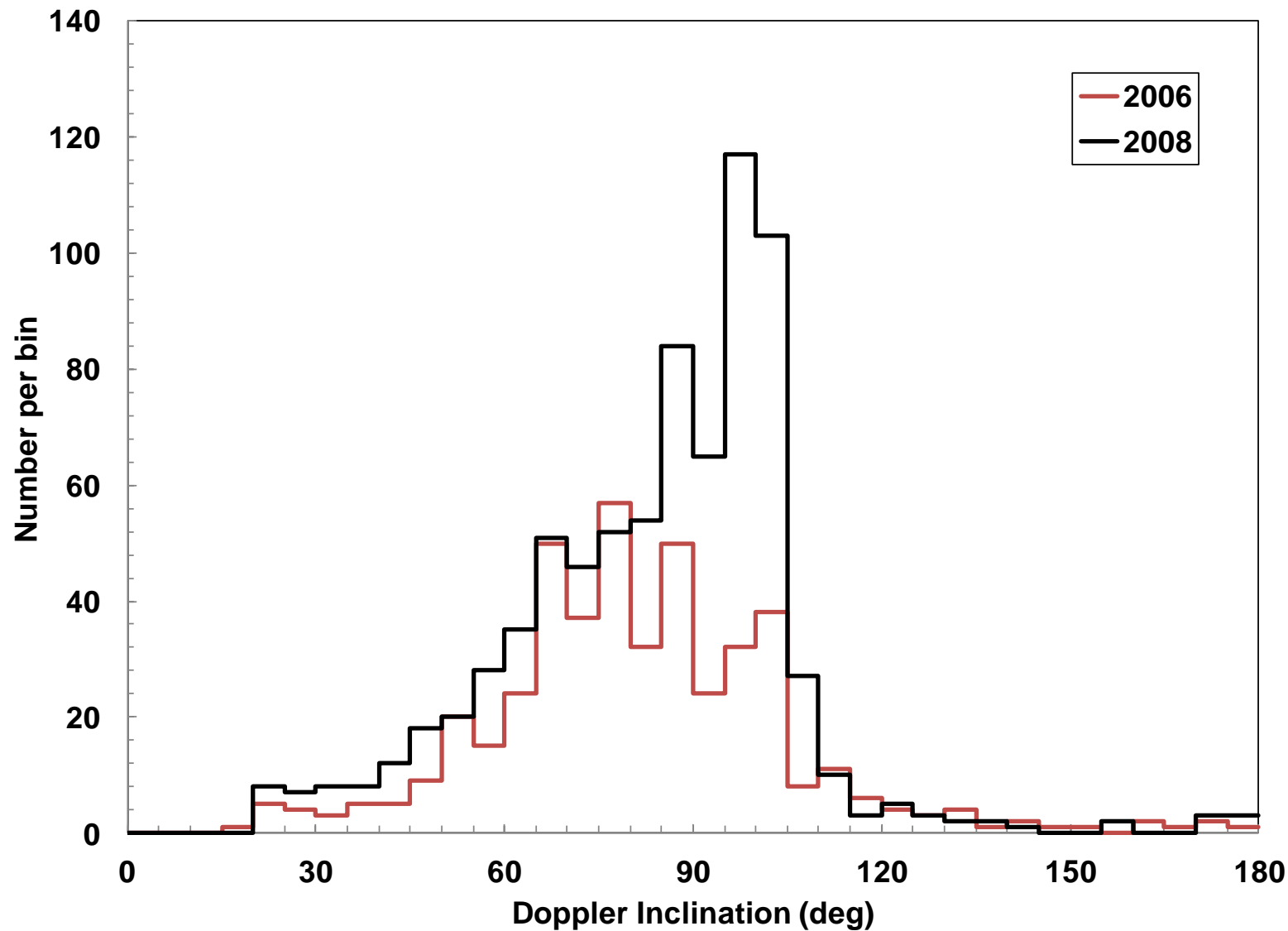


# Haystack Altitude Distribution



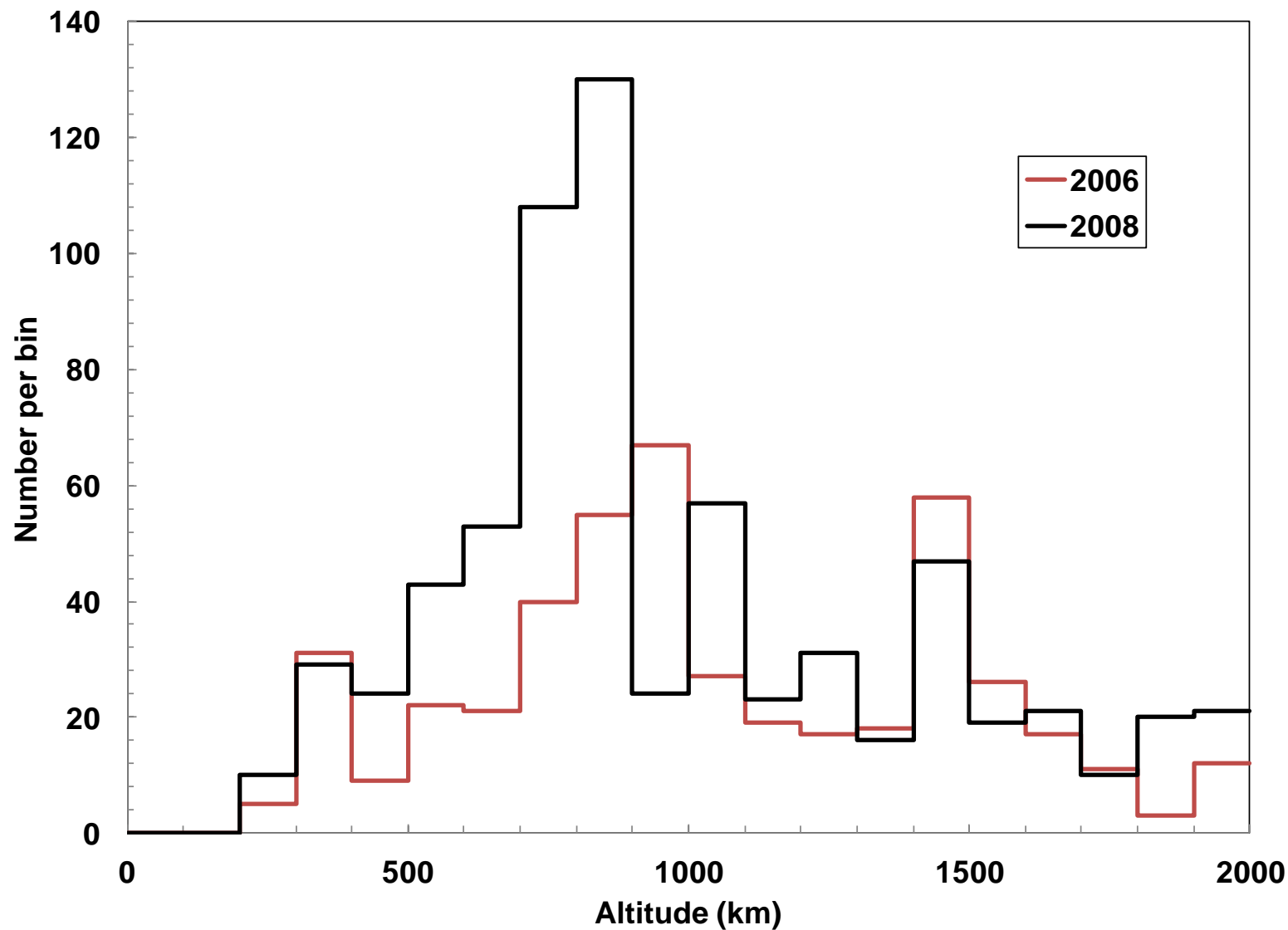


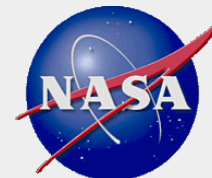
# TIRA Inclination Distribution



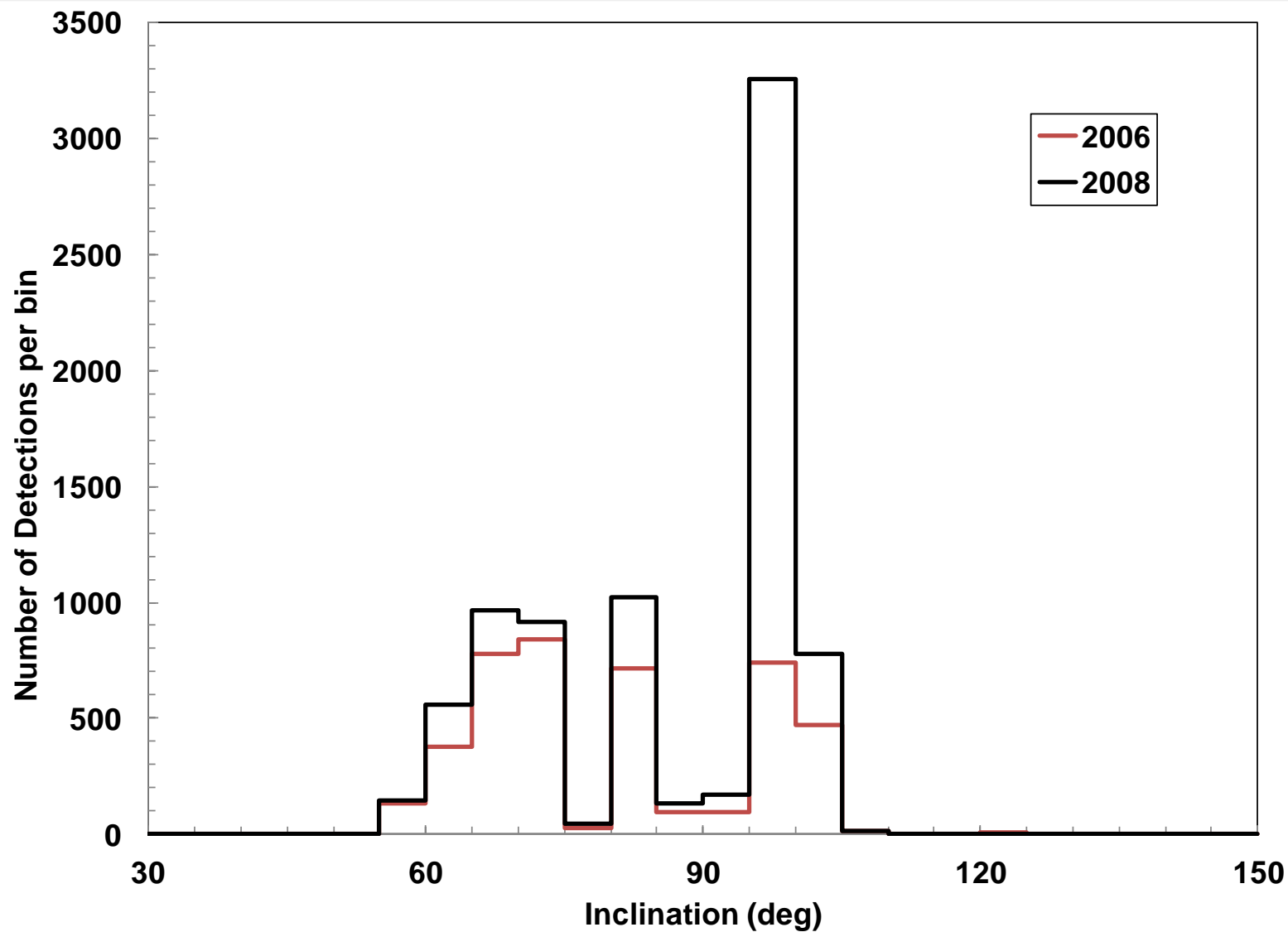


## TIRA Altitude Distribution

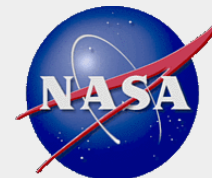




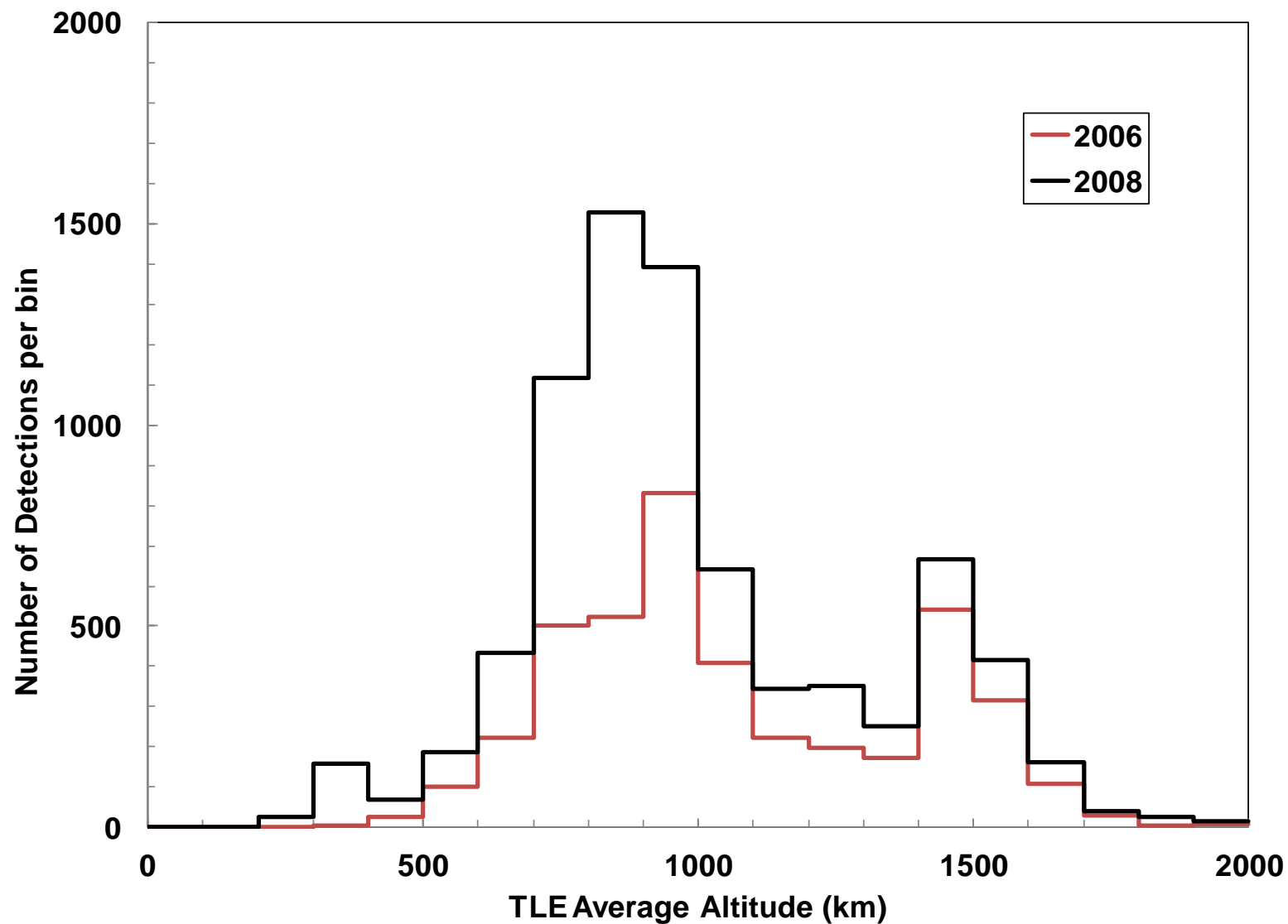
## Cobra Dane Inclination Distribution

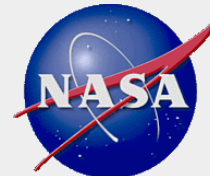




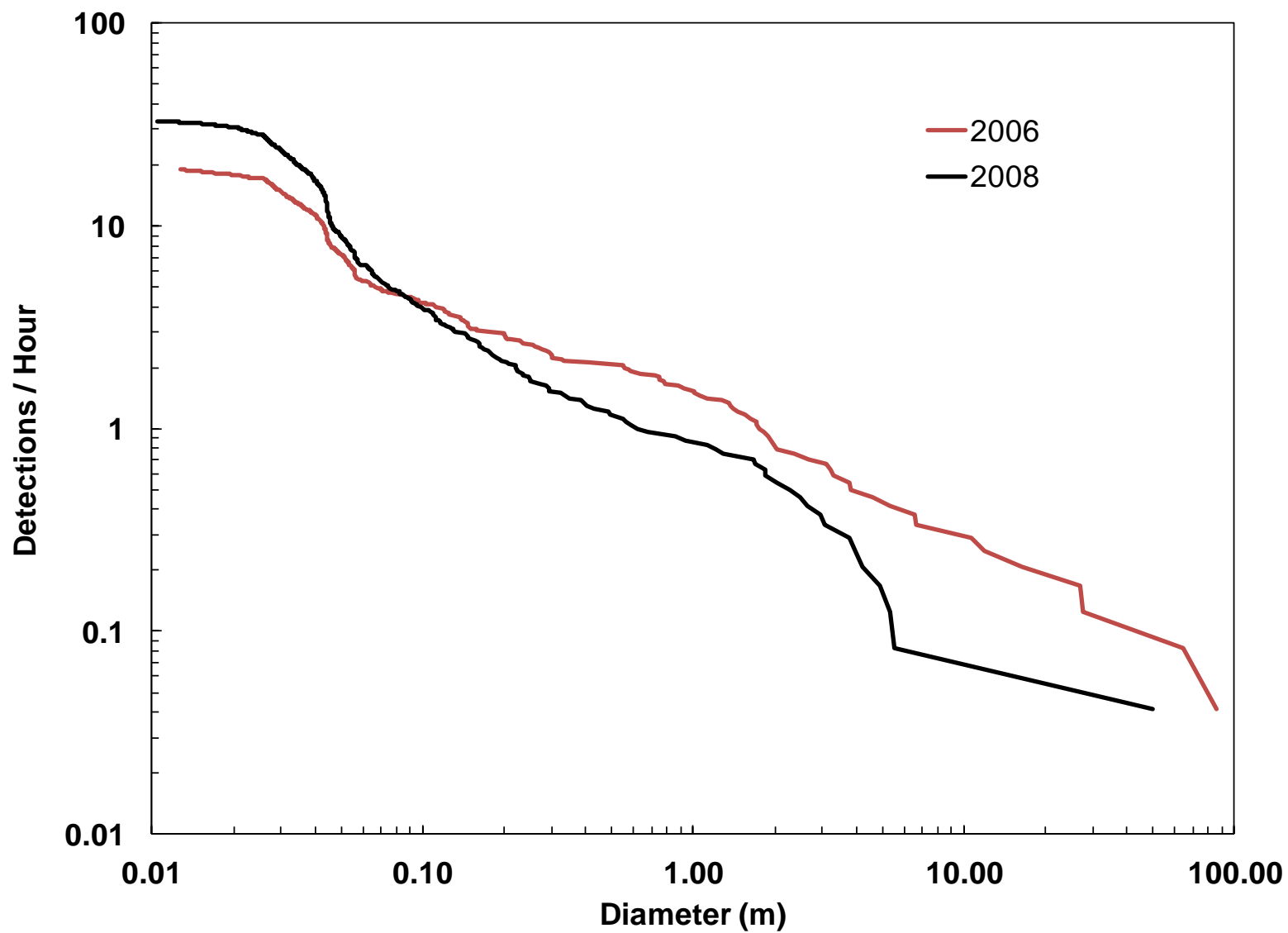


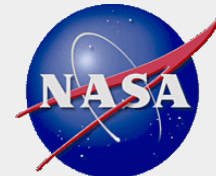
## Cobra Dane Altitude Distribution





## TIRA Size Distribution





# Haystack Size Distribution

