National Aeronautics and Space Administration

Auroral Imager Accommodation Parameters and Measurement Capabilities

for proposals in response to the DYNAMIC AO

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FOREWORD

The Announcement of Opportunity (AO) for the Dynamical Neutral Atmosphere-Ionosphere Coupling (DYNAMIC) investigation describes an incentive for projects that propose to, and are able to, accommodate an auroral imager. The AO also describes availability of auroral imager data to use in the baseline science investigation for proposals that exercise the auroral imager option.

Section 1 of this document provides maximum accommodation parameter envelopes to use as assumptions when discussing the ability to accommodate the auroral imager.

Section 2 of this document provides basic minimum measurement performance parameters envelopes to use as assumptions when discussion any inclusion of auroral imager data in the baseline investigation.

Further details on the auroral imager characteristics and capabilities will follow during Phase A for those project that are selected to proceed into Phase A.

1. Auroral Imager Accommodation Parameters

As no particular imager has been identified yet, NASA is providing estimates for the instrument's technical specifications. Table 1 summarizes the accommodation parameters to use as enveloping assumptions.

Table 1. Auroral Imager Accommodation Parameters

Parameter	Not to Exceed Value	Note
Mounting Location	Nadir deck	Proposal should indicate location and orientation.
Sensor Head Length Sensor Head Width Sensor Head Height	80 cm 60 cm 50 cm	Axis with aperture
Electronics Box Length Electronics Box Width Electronics Box Length	15 cm 15 cm 15 cm	Proposal should placement and approximate distance from sensor head.
Sensor Head Mass	35 kg	
Electronics Box Mass	5 kg	
Power, Average	50 W	Value includes electronics and heaters
Data Rate, Average	600 kbps	
Field of Regard	Earth	FOR must be sufficient for full view of Earth, limb-to-limb from the science orbit proposed
Pointing Control Accuracy Pointing Knowledge Accuracy Pointing Stability	120 arcsec 120 arcsec TBD	3-sigma, per-axis 3-sigma, per-axis Proposal should indicate capability in proposal
Electrical Interfaces, Command and Telemetry	TBD type; Provide 1 PPS	Proposal should specify available options for type of interface (RS-422, Serial LVDS, Spacewire, Ethernet, other).
Electrical Interfaces, Power	Up to 4	• Proposal should assume 28V unregulated • Instrument could require up to four interfaces
Electrical Interfaces, Temperature Measurements	Up to 4	To be designed by Auroral Imager provider. Instrument could required measurements of up to 3 sensor head and 1 electronics box temperatures.
Allowable Flight Temperature	TBD	• Thermally isolated interface to sensor head • Heater power is included in average power above
Cleanliness Requirements	ISO 7	The instrument requires Class 10K clean room assembly and a T0 purge.
Noise Sources	TBD	The instrument could include the following element(s). Proposal should indicate any accommodation sensitivity. • a High Voltage Power supply • an actuator (magnetic source) • a deployable cover

2. Auroral Imager Measurement Capabilities

The Auroral Imager is expected to operate in one or two wavelength range(s) and to provide images that meet or exceed with the following characteristics.

Table 2. Minimum Auroral Imager Measurement Capabilities

Parameter	Minimum Performance	Note
Wavelength	TBD	To be specified by Auroral Imager provider. Proposals should assume one emission band visible on the night side, with the expectation that it will be in the ultra-violet (UV) range.
Field of View	25 deg (circular)	
Angular Resolution	0.5 deg	
Measurement Cadence	2 / min	
Responsivity	30 counts / kR / pixel	
Dynamic Range	100 R – 5 kR	

3. Acronyms and Abbreviations

AO...Announcement of Opportunity

DYNAMIC ....Dynamical Neutral Atmosphere-Ionosphere Coupling

S/C..Spacecraft

TBD..To be determined

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