

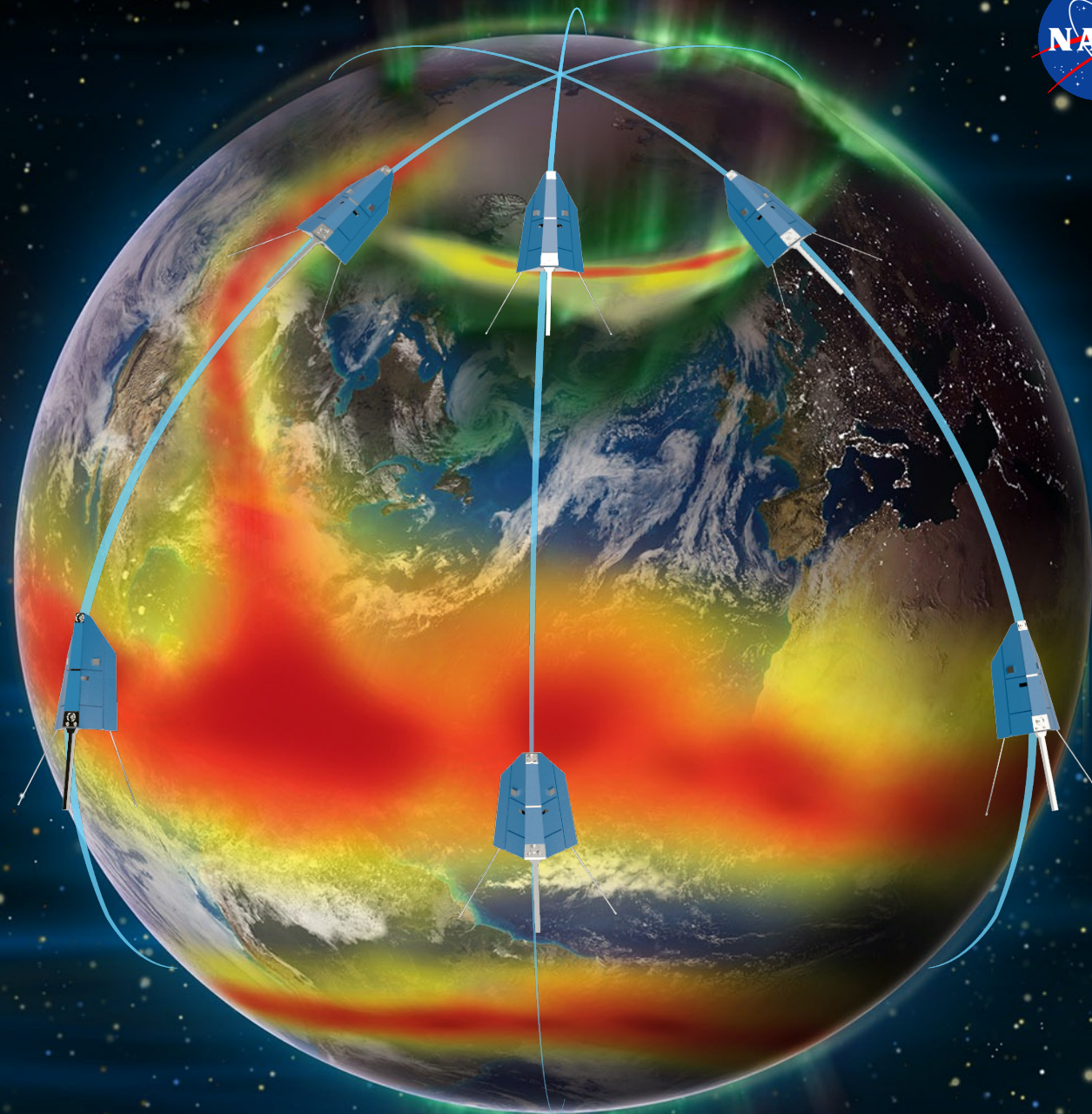
National Aeronautics and Space Administration



# GDC Proposal Information Package

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GDC Project Office • NASA GSFC

GDC Pre-Proposal Conference  
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[www.nasa.gov](http://www.nasa.gov)



- Proposal Information Package (PIP) addresses technical and programmatic topics for GDC
  - GDC PEA policies described in the Overview of the GDC PEA
  - GDC PIP information will be incorporated into the evaluation described in Science Review and TMC Review
  - GDC Program Library contains the referenced documents
- PIP contains labeled requirements for investigations [GDC-PIP-<#>]
  - Compliance assessed in evaluation process, per GDC PEA Requirement P-1
- Topics summarized in this presentation:
  - Technical PIP requirements (21), see PIP Appendix B
  - Deliverables (69 CDRLs + 27 IMAR DIDs), see CDRL and IMAR documents.
  - Schedule (notional timeline included)
  - GDC project structure (notional org chart included)



# Geospace Dynamics Constellation



## GDC Instrument Technical Overview



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- Pre-formulation work outlined a mission implementation that minimizes risk while retaining flexibility to maximize mission science return
- Project-level risks that drive requirements on instruments:
  - Constellation size and spacecraft bus to be finalized
  - Science payload composed of multiple providers, potential instrument cross-interference
    - e.g. electromagnetic/-static cleanliness, contamination
  - Science payload resource constraints, meeting science requirements within likely spacecraft resources
  - Instrument quantities per provider
  - Instrument performance verification (calibration)
- Requirements developed using information on potential spacecraft and instruments
  - Spacecraft: Combined internal GSFC work and external market survey, used common elements
  - Instruments: Flight heritage from successful missions, multiple options per payload component to avoid provider-specific bias

*Note: Payload = collection of GDC instruments*

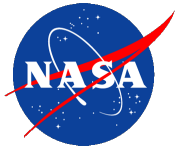
# Instrument Accommodation



- Accommodation risks relate to the integration & operations of the science payload
  - PIP identifies both instrument requirements and instrument challenges
- Accommodation requirements must be met by the proposals
  - Described in GDC PIP; captured by GDC-PIP-4.1, GDC-PIP-4.2
  - Identified in risk-rated findings in the evaluation process (see TMC Review)
- Based on the potential spacecraft options, accommodation challenges are potential issues that will be considered in the evaluation and selection process (see Overview of the GDC PEA)
  - Described in GDC PIP, Section 4.3 – this list of challenges is non-exhaustive, captures major potential issues
  - Instruments need to **a)** fit on the spacecraft; **b)** operate where they fit; and **c)** ensure their operation doesn't impact the spacecraft or the other instrument's operations.
  - May be identified by non-risk-rated findings in the evaluation process (see TMC Review)
  - Assessed in the Pre-Selection Accommodation Study (see GDC PEA, Section 7.2.1)
  - Considered in the Selection Process (see Overview of the GDC PEA)

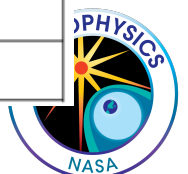


# Instrument Accommodation



- Pre-Selection Accommodation Study will consider the following elements:
  - Instrument Accommodation Worksheet
  - Findings generated by TMC review
- Study will be conducted on the entire payload, not instrument-by-instrument
  - Assess ability for the complete payload to be accommodated on a spacecraft
  - Assess potential interference or contamination from one instrument to another

|                     |                                                 | Estimated Spacecraft Resources<br>Maximum Expected Values (MEVs) |                     |
|---------------------|-------------------------------------------------|------------------------------------------------------------------|---------------------|
|                     |                                                 | Per Instrument                                                   | Entire Payload      |
| Critical Parameters | <b>Mass</b> (Includes Sensor and Electronics)   | 7.7 kg                                                           | 33.6 kg             |
|                     | <b>Volume</b> (Includes Sensor and Electronics) | 0.02 m <sup>3</sup>                                              | 0.30 m <sup>3</sup> |
|                     | <b>Power</b> (Average)                          | 26.9 W                                                           | 68.3 W              |
|                     | <b>Data Rate</b> (Average)                      | 10.5 kbps                                                        | 25 kbps             |
|                     | <b>Deck Mounting Area</b>                       | <b>Ram</b>                                                       | 0.12 m <sup>2</sup> |
|                     |                                                 | <b>Nadir</b>                                                     | 0.06 m <sup>2</sup> |
|                     |                                                 | <b>Zenith</b>                                                    | 0.06 m <sup>2</sup> |
|                     |                                                 | <b>Anti-Ram</b>                                                  | 0.01 m <sup>2</sup> |



# Geospace Dynamics Constellation



## GDC Instrument Deliverables Overview



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# Instrument Deliverables



- Investigations are responsible for deliverables described in the PIP, Instrument Mission Assurance Requirements (IMAR), & Contract Data Requirements List (CDRL) documents
  - IMAR Document Identifiers (DIDs): 27
  - CDRLs: 69
- Requirements were developed to reduce complexity and minimize risk
  - Clear division of responsibilities between investigations and Project Office
  - Testing requirements, as defined in the PIP
  - All Flight Hardware deliverables and qualification requirements identified
    - See Table 8-1 (next chart)



# Instrument Deliverables



**GDC PIP  
Table 8-1**

|               | Control Electronics Engineering Test Unit | Instrument Engineering Test Unit | Flight Units     | Instrument Flight Spare                  |
|---------------|-------------------------------------------|----------------------------------|------------------|------------------------------------------|
| Quantity      | 1                                         | 1                                | n                | 1                                        |
| Delivery Date | ICDR                                      | ICDR                             | As stated in PEA | 1 month after final flight unit delivery |

- All Flight Units and spare flight units to be tested to proto-flight qualification levels prior to delivery
- n = number of instrument copies to be delivered for flight (excluding the spare)
- Note: PIP 8.1.3.4 – Flight Spare Electronics: Build and test spare PCBs for complex boards and kit parts for simple boards.



# Instrument Deliverables



- Instruments are currently expected to be integrated onto the GDC observatories as they are delivered (one/month, starting October 2025; see next section, PIP Sec. 8.3)
- Investigations are responsible for supporting the integration of delivered instruments, per PIP Section 8.4.3



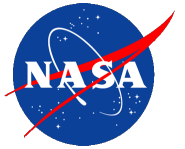
# Geospace Dynamics Constellation



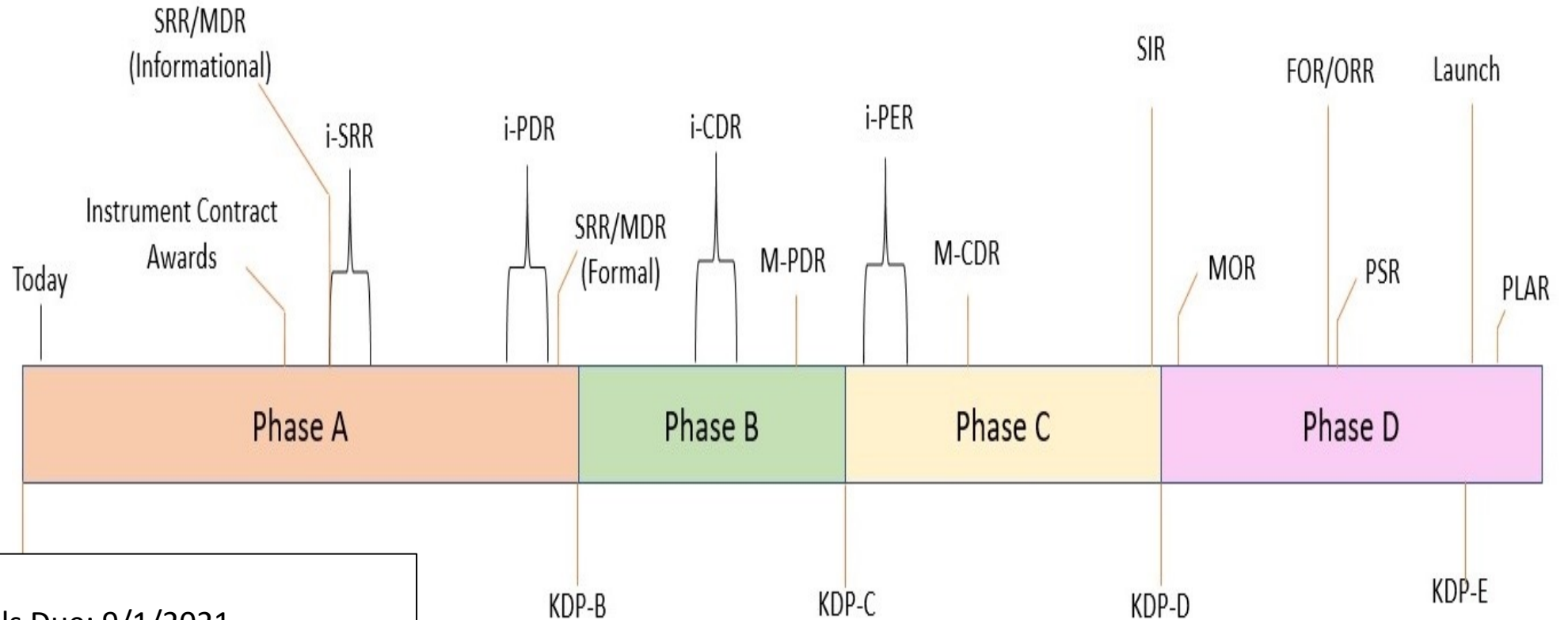
## GDC Instrument Schedule Overview



# Notional Mission Development and Implementation Timeline



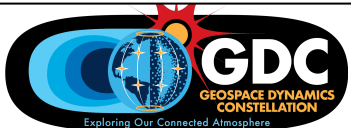
**GDC PIP**  
**Figure 3-1**



## Key Dates:

- Instrument Proposals Due: 9/1/2021
- Instrument Selection: 1/2022 (target)
- Instrument Quantity Decision: Q1 2023
- **First Instrument Delivery: 10/2025 (1/month)**
- Launch Readiness Date: 9/2027

*Note: Spacecraft vendor not yet selected, so specific dates not available.*



# Notional Review/Meeting Schedule



**GDC PIP  
Table 10-1**

| Event        | Definition                           | Date                                            |
|--------------|--------------------------------------|-------------------------------------------------|
| Kick Off     | ---                                  | ~1 month after award                            |
| IMRs         | Instrument Monthly Reviews           | Monthly                                         |
| TIM          | Technical Interchange Meeting        | As needed (at a minimum quarterly)              |
| Peer Reviews | ---                                  | As required                                     |
| ISRR         | System Requirements Review           | ~4 months after award                           |
| IPDR         | Instrument Preliminary Design Review | ~9 months after SRR                             |
| ICDR         | Instrument Critical Design Review    | ~9 months after PDR                             |
| ITRR         | Instrument Test Readiness Review     | As needed, prior to planned test                |
| IPER         | Pre-Environmental Review             | Prior to instrument level environmental testing |
| IPSR         | <b>Pre-Ship Review (~Oct 2025)</b>   | <b>Prior to instrument delivery</b>             |



# Geospace Dynamics Constellation



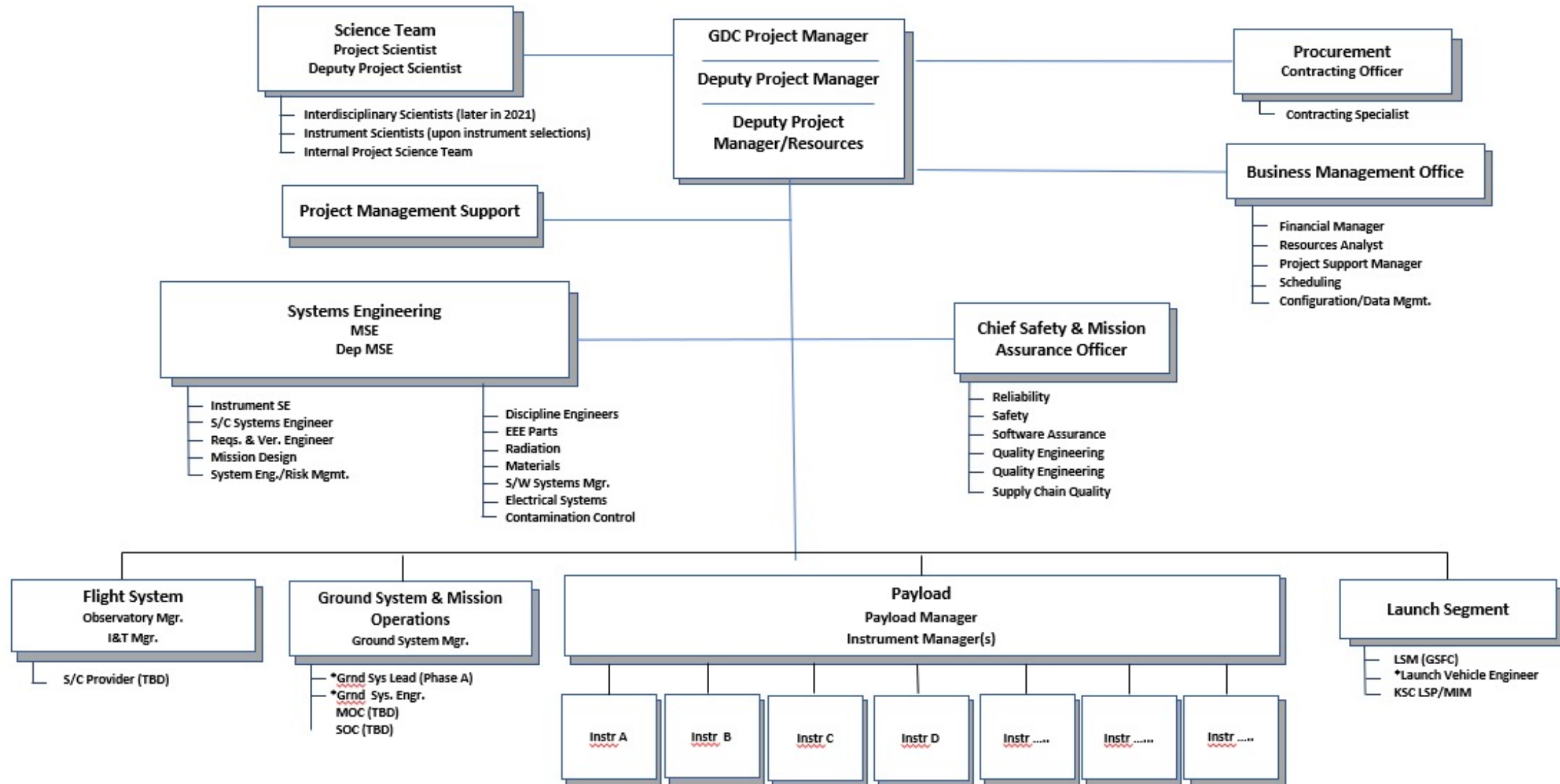
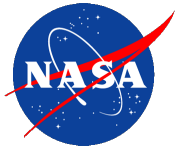
## GDC Project Structure



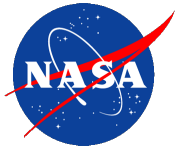
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# GDC Project Organization Team



# Questions?



## Answers to previously submitted questions:

<https://lws.larc.nasa.gov/gdc/faq.html>

(*Questions & Answers* tab on SOMA's GDC Acquisition Homepage)

Questions accepted up to 21 days before the proposal due date [PEA Sec. 9]

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