



RSDO Rapid Spacecraft Development Office & Rapid IV Introduction



ACQUISITION
INNOVATION

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Agenda



- RSDO Mission and History
- RAPID I-IV Contracts
- Vendor Eligibility
- The Catalog/Index
- How To use Rapid IV
- The Customer Process and Benefits

“Save Time and Money with RAPID IV Spacecraft.”



RSDO MISSION (1 of 3)



- **Rapid Spacecraft Development Office (RSDO)**
 - Develop and manage the Rapid Spacecraft Acquisition IV (Rapid-IV) contracts and catalog (index) which **serve as a fast & flexible Government-wide procurement tool** for proven spacecraft designs & spacecraft components.
 - Provide spacecraft (s/c) procurement planning, preparation, and implementation support to Government customers.
 - Conduct periodic On-Ramps (re-open the original Rapid IV solicitation) to refresh the catalog vendors and s/c designs.

- **Rapid IV Procurement Tools**
 - **Conduct a Request for Information (RFI), no cost to the customer, which results in pre-solicitation vendor review of the customer's requirements and a report on the vendor's conceptual solution including ROM.**
 - **Conduct a spacecraft (s/c) study procurement via the Request for Offer (RFO). The resulting Delivery Order (DO) is awarded to multiple vendors. The vendors review of the customer requirements and a detailed conceptual s/c design and implementation schedule, plus a ROM price estimate.**



RSDO MISSION (3 of 3)



- **Rapid IV Procurement Tools**
 - **Conduct a s/c procurement via an RFO which results in the award of a DO to a Rapid IV spacecraft vendor to deliver the s/c on orbit.**
- **These same three procurement tools can be applied to spacecraft component/subsystem/system procurements, as well.**



Rapid Contract



- **Rapid Spacecraft Acquisition**
 - **The goal is to leverage industry's spacecraft design successes for the purpose of reducing the Government's cost, schedule, and technical risk of procuring and developing spacecraft for NASA and other U.S. Government space missions.**
 - **The RSA serves as a GSFC-managed Multi-Agency Contract (MAC) tool for the repurchase of successfully flown industry spacecraft designs (with modification).**
 - **The Contract Type is: Indefinite Delivery, Indefinite Quantity with Firm Fixed Price Delivery Orders.**



CONTRACT HISTORY (1 of 2)



- **Rapid I Contract: 1997-2000**
 - 8 vendors participated, offering 16 spacecraft
 - 5 mission spacecraft ordered
 - 4 spacecraft met or exceeded their requirements (1 DoD, 3 NASA). Three remain operational.
 - 1 launch vehicle failure
- **Rapid II Contract: 2000-2005 (extended to 2008)**
 - 11 vendors participated, offering 24 commercial spacecraft
 - 3 mission spacecraft ordered
 - 3 spacecraft met or exceeded their requirements. All remain operational. (all NASA)
 - 1 flight component ordered and successfully delivered



CONTRACT HISTORY (2 of 2)



- **Rapid III Contract: 2010-2020 (extended 5 years and 9 months)**
 - 10 vendors participated, offering 18 spacecraft
 - 7 mission spacecraft awarded
 - 6 mission spacecraft were successfully placed on-orbit
- **Rapid IV Contract: 2020-2025**
 - 14 vendors participated, offering 29 spacecraft
 - On-Ramp 1 Completed 3/12/2021
 - On-Ramp 2 Complete on 02/15/2022
 - On-Ramp 3 Complete on 02/15/2022
 - 1 Spacecraft award
 - 1 Spacecraft under development

CONTRACTOR HISTORY (1 of 3)

Contract	Contractor(s) & S/C via On Ramp	No. of S/C in Catalog	Ordering Period Start Date	Ordering Period End Date
Rapid I	Ball (1) LM (2) Loral (1) Orbital (8) Spectrum (1) Surrey (1) Swales (1) TRW (2)	17	10/1997	12/1999
Rapid II	Ball (2) LM (1) Orbital (5) Spectrum (2) Surrey (1) TRW (3)	14	1/2000	1/2005
Rapid II On-Ramp 1	Orbital (+1)	15	2/2000	1/2005
Rapid II On-Ramp 2	Spectrum (+1) Surrey (+2) Swales (+1)	19	11/2000	1/2005
Rapid II On-Ramp 4	Astrium (+1) TRW (+1)	21	8/2001	1/2005
Rapid II Extension	LM (-1) Swales (-1) TRW (-4)	15	1/2005	1/2008
Rapid II On-Ramp 7	Alcatel (Thales) (+1)	16	11/2006	1/2008
Rapid II On-Ramp 14	Loral (+1) MicroSat (+1)	18	3/2007	1/2008

CONTRACTOR HISTORY (2 OF 3)

Contract	Contractor(s) & S/C Added via On Ramp		No. of S/C in Catalog	Ordering Period Start Date	Ordering Period End Date
Rapid III	Ball (1) NGC (1) TAS/F (1)	LM (1) Orbital (3) Surrey (3)	10	3/31/2010	3/30/2015
Rapid III On-Ramp 1	TAS/I (1) LM (+1)		12	7/19/2012	3/30/2015
Rapid III On-Ramp 2	Ball (+1)		13	11/6/2012	3/30/2015
Rapid III On-Ramp 3	Boeing (+1)	LM (+1)	19	4/19/2016	3/30/2020
	QinetiQ (+1)	SS/Loral (+1)			
	Surrey US (+1)	TAS/Fr (+1)			
Rapid IV	Ball (+2)	NG (+2)	8	9/1/2020	8/31/25
	MAXAR (+1)	SwRI (+1)			
	Tyvak (+2)				
Rapid IV On-Ramp 1	SwRI(+1) TAS/F (+1) TAS/I (+1)		11	3/12/2021	8/31/2025
Rapid IV On-Ramp 2	LMC (+2) SFL (+2) QinetiQ (+1)		16	02/15/2022	8/31/2025



CONTRACTOR HISTORY (3 OF 3)



Contract	Contractor(s) & S/C Added via On Ramp	No. of Contractors	No. of S/C in Catalog	Ordering Period Start Date	Ordering Period End Date
Rapid IV On-Ramp 4	Argotec (+3) BCT (+3) GA (+1) NanoAvionics (+1) NG (+1) Tyvak (+4)	14	29	05/6/2024	8/31/2025

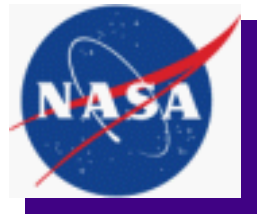
MISSION AWARD HISTORY (1 OF 3)



RSA Contract	Mission	Contractor at Award	Contract Number	RFO Issue Date	Award Date	Days to Award	Launch Date	Months Award to Launch	End of Life
Rapid I	Quik-SCAT (NASA)	Ball Aerospace	NAS5-97251	11/3/97	11/24/97	21	06/19/99	19	11/2007
Rapid I	ICESat (NASA)	Ball Aerospace	NAS5-97251	11/12/97	2/5/98	85	01/12/03	35	1/2010
Rapid I	Coriolis (DoD)	Spectrum Astro	NAS5-97256	1/22/99	3/23/99	60	01/06/03	46	TBD
Rapid I	Quik-TOMS (NASA)	Orbital Sciences	NAS5-97254	6/18/99	7/30/99	42	09/21/01	26	ELV Failure
Rapid I	Swift (NASA)	Spectrum Astro	NAS5-97256	5/14/99	8/24/99	102	11/20/04	63	TBD
Rapid II	NPP (SUOMI) (NOAA)	Ball Aerospace	NAS5-00106	3/4/02	5/31/02	88	10/28/11	113	TBD
Rapid II	GLAST (FERMI) (NASA)	Spectrum Astro (GenDyn AIS)	NAS5-00110	5/10/02	8/30/02	112	6/11/08	70	TBD
Rapid II	LDCM (LANDSAT 8) (USGS)	GenDynAIS (OSC)	NAS5-00110	12/07/07	4/28/08	142	2/11/13	58	TBD



MISSION AWARD HISTORY (2 OF 3)



RSA Contract	Mission	Contractor	Contract Number	RFO Issue Date	Award Date	Days to Award	Launch Date	Months Award to Launch	End of Life
Rapid III	JPSS1 (NOAA)	Ball Aerospace	NNG10AZ45D	8/30/2010	9/23/10	30	11/18/17	86	TBD
Rapid III	ICESat 2 (NASA)	OSC	NNG11VG01D	3/9/11	9/1/11	180	9/15/18	84	TBD
Rapid III	Polar Free Flyer 1 (NOAA)	N/A	Procurement Cancelled March 2014	2/27/2013	N/A	N/A	N/A	N/A	N/A
Rapid III	JPSS2 (NOAA)	OSC	NNG15VE05D	8/14/2014	3/30/15	229	11/10/22	TBD	TBD
Rapid III	Landsat 9 (USGS)	OSC	NNG17VV00D	5/18/2016	10/25/16	161	TBD	TBD	TBD
Rapid III	SWFO-L1 (NOAA)	Ball	NNG10AZ10B	1/30/2020	6/25/2020	147	TBD	TBD	TBD
Rapid IV	Quick Sounder (NOAA)	SWRI	80GSFC24F00 01	3/13/2023	10/25/23	226	2/1/26	TBD	TBD
Rapid IV	SW L1 Next L1-A	TBD	TBD	6/3/24	TBD	TBD	6/29	TBD	TBD



MISSION AWARD HISTORY (3 OF 3)



RSA Contract	Mission	Contractor	Contract Number	RFO Issue Date	Award Date	Days to Award	Launch Date	Months Award to Launch	End of Life
Rapid III	JPSS4 (NOAA)	NG(OSC)	NNG15VE05D	8/14/2014	5/18	229	2027	TBD	TBD
Rapid III	JPSS3 (NOAA)	NG(OSC)	NNG15VE05D	8/14/2014	5/18	229	2032	TBD	TBD
Rapid IV	SW L1 Next L1-B	TBD	TBD	6/3/24	TBD	TBD	10/32	TBD	TBD



Rapid-IV Spacecraft Catalog (Index)?



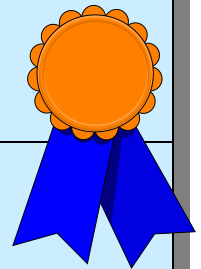
- **Catalog (Index) of Proven Spacecraft Designs**
 - Already under contract
 - Available for purchases by customers
 - Spacecraft design modifications are possible
- **Rapid-IV Master Contracts**
 - Awarded to multiple spacecraft vendors
 - Firm fixed price master contracts and DOs
 - DO awards for Spacecraft & S/C Components
 - Modifiable Delivery Order Terms & Conditions
 - Periodic On-Ramps to refresh catalog (Index)
 - *Full prime contractor services available on all DOs*
- **Reimbursable fee for non-NASA Customers**



Contractor Services to be Provided



- Program and Quality Management
- Systems Engineering
- Spacecraft (S/C) Build & Test
- Interface Integration + ICDs
- Payload to S/C Integration & Test (I&T) Support
- Observatory Environmental Test
- Shipment to Launch Site
- Launch Vehicle I&T and Launch Support
- On-Orbit Checkout & Acceptance Review
- Acceptance AFTER On-Orbit Checkout
- Sustaining Engineering (Pay-As-You-Use)





Rapid IV Catalog (Index)

Vendors (1 of 2)



Vendor	Spacecraft	Heritage Missions	Payload Mass (kg)	Available Power (w)
Northrup Grumman	ESPA Star-D	EAGLE	1,920 kg	1,200
Thales Alenia - Italy	PRIMA	Sentinel 1C/1D	1138	1100
Northrop Grumman	LEOStar-3	Landsat, JPSS-2,3,4, IceSat,	850 (Standard), up to 3000 flown	580
Lockheed Martin	LM2100	XXArabsat-6A, HellasSat-4, JCSAT-17, SBIRS GEO-5 X	664 (Analysis up to 1670 kg)	16400
Ball Aerospace	BCP Large	SNPP, JPSS-1	610	600
MAXAR	1300	130 to orbit	500	1973
Thales Alenia - France	ELiTeBUS 1000	Globalstar-2, Iridium	350	1500
Space Flight Laboratory	DAUNTLESS	NEMO-HD	300	173
Tyvak	Ambassador	Tranche 1	200 kg	1500
Blue Canyon Technologies	XSAT Saturn	Blackjack	200kg	500
Ball Aerospace	BCP Small	GPM	170	90
Tyvak	Nebula	Tranche 0	130 kg	1000
QinetiQ Space	P200	FLUIDPAC, PROBA-1, PROBA-2, PROBA-V	100	70
Blue Canyon Technologies	XSAT Venus	YellowFin R3D2	78kg	65
Lockheed Martin	LM4XX	GRAIL, XSS-11	75	409



Rapid IV Catalog (Index)

Vendors (2 of 2)



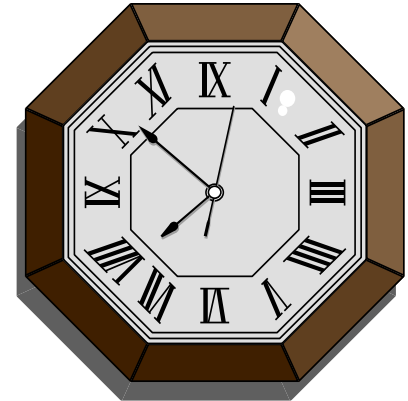
Vendor	Spacecraft	Heritage Missions	Payload Mass (kg)	Available Power (w)
General Atomics	GA-150	OTB-1, Argos-4	60 kg	100
Northrop Grumman	ESPASat-Ex	TESS, ICON, Mycroft, ANGELS	50	100
Southwest Research Institute	SwSP-100	SensorSat	30	50
Space Flight Laboratory	DEFIANT	HawkEye 360 Cluster 2	30	50
Blue Canyon Technologies	CubeSat	AMS	6kg, 20kg, 23kg	39
Tyvak Nano Satellite	Trestles-12U	Pathfinder Tech	15.5	60
Southwest Research Institute	SwSP-35	CYGNSS	11	22
Tyvak	Renegade	Trestles	10 kg	100
Kongsberg NanoAvionics US	NA-MP12	NASA ACS-3, LEO-1&2	10 kg	26
Argotic	Hawk-EO	IRIDE fleet	9.2kg	125
Argotic	Hawk 12U	HENON	<8kg	128
Tyvak Nano Satellite	Trestles-6U	Pathfinder Tech	7.31	35
Tyvak	Triumph	Trestles	5 kg	100
Argotic	Hawk 6U	ArgoMoon, LiciaCube	<4kg	48



Why Use Rapid IV?



- Acquisition process: Draft RFO thru Delivery Order Award
 - 6 to 8 Months for SC cost > \$50M
 - 3 Months for SC cost < \$10M
- Use RSDO Procurement Staff
 - Minimizes your acquisition staff
 - Use your technical/business staff
- Risk Mitigation
 - Start with Proven Spacecraft Designs
 - Contains full Insight/Oversight Provisions
- Spacecraft Options
 - Capability Enhancements/Reductions
 - Studies: Payload & Mission Accommodations
 - Mission Operations Support





Offeror/Spacecraft Eligibility



- For an offeror's company to be eligible for inclusion in the Rapid IV catalog, the offeror's company shall have developed and flown, at least TWO spacecraft successfully through on-orbit checkout and acceptance.
- In order for the offeror's heritage design to be eligible to be proposed for inclusion in the Rapid IV catalog, the offeror's heritage spacecraft design shall have successfully flown, at least ONCE, through on-orbit checkout and acceptance.
- The offeror shall provide information verifying that they have been the contractor on a minimum of two successful spacecraft developments.
- The RSDO staff contact all past customer references, review CPARS and contact any other sources of Relevant Experience and Past Performance contacts.



Technical Acceptability Standards (1 of 3) used for On-Ramps and Delivery Orders



- (1) The offeror's Technical Acceptability Standards **Compliance Matrix is complete** and traces the offeror's compliance with each of the Technical Acceptability Standards.
- (2) The offeror's proposed top-level **implementation schedule is complete** and addresses all the elements specified in L.23, B(2).
- (3) The offerors narrative is **complete and adequately demonstrates its approach to compliance with all subsections of SOW** Section 4.0 of the Rapid IV SOW.
- (4) The offeror has provided a statement that **identifies which quality management system is being used** by the offeror.



Technical Acceptability Standards (2 of 3)



- (5) The offeror's narrative is **complete and adequately describes how its Core Spacecraft** design matches the stated performance characteristics stated in CDRL 1.
 - a. **Heritage Spacecraft Design Overview** – The offeror's brief overview of the design and performance of the heritage spacecraft is complete and used as a starting point for the Core Spacecraft being offered for the Rapid IV Catalog.
 - b. **Core Spacecraft Variances** - The description and rationale for any subsystems or "box-level" variances between the proposed Core Spacecraft design and the heritage spacecraft design is complete and adequate.
 - c. **Core Spacecraft Systems Overview** - The overview of the design and performance of the proposed core spacecraft offering as detailed in the Core System Performance Specification, CDRL 1 is complete and adequate, including the offeror's ability to support the performance claims indicated in the CDRL 1 data and the offeror's proposed system block diagram, down to the component box level.



Technical Acceptability Standards (3 of 3)



- (6) The offeror's response adequately demonstrates that it possesses or has the **ability to obtain the necessary and adequate facilities.**
- (7) The proposed spacecraft designs have both a **minimum payload mass capability of 7 kilograms and a minimum payload power capability of 20 Watts, or greater** (i.e., Cubesats to Geosats).
- (8) The offeror has provided a **complete Master Subcontracting Plan** (applicable only to large businesses) as described and required by the FAR Clause 52.219-9 – Alternate II.
- (9) The **Appendices referenced in L.23 (A, B, and C) are complete** (including or referencing all CDRL documents) and adequate.
- (10) The offeror's proposed **performance-based payment schedule** for each core system is complete, adequate, and includes the major payment milestones listed in Clause H.9, Performance-Based Payment Events and Completion Criteria.

How Rapid IV Works



- **Firm Fixed Price Contract (Core S/C)**
 - Individual fixed price DOs
 - No EVM
 - Payback/Replacement of Spacecraft Clause
 - Controlled task pool options for unknowns
- **Payments AFTER Milestone Completions**
 - Final payment (10%) AFTER successful on-orbit checkout & acceptance review completion
- **Requests for Information (Market Surveys)**
 - No cost (\$\$) to customer (vendor funded)
 - Mission requirements previewed by vendors
 - Spacecraft concept is developed
 - Schedule concept is developed
 - Rough Order of Magnitude (ROM) estimates



How Rapid IV Works (Emphasis on Studies)



- Fixed price nature of RSDO demands a thorough understanding of the customer's mission requirements **BEFORE** signing the spacecraft delivery order.
- Studies are the perfect tool for:
 - Define Payload Accommodation Requirements
 - Define Mission/Systems Design Requirements
 - Define Programmatic Requirements
 - Statement of Work Definition
 - Government Insight Definition
 - Instrument Accommodation Assessments
 - LV Interface Definition
 - Operations Requirements Definition
 - Finalizing Performance Requirements Documentation

Rapid-IV Process



Introduction

Mission Learns about Rapid-IV & RSDO
RSDO Learns about the Mission needs.
Is Rapid-IV the “Right Tool” ?

Strategy

Customize the Acqn Approach
Develop Acqn Docs & Mods
Prepare RFI-Study RFO-S/C RFO

Acquisition

Release DRFO/RFO
Evaluate Vendor Proposals
Select Vendor & Award DO

Acquisition: 6 to 8 Months > \$50M SC Cost
3 Months < \$10M SC Cost

Transfer Delivery
Order to Customer CO

Hand Off



Summary

- **RSDO Catalog (Index) has 29 available spacecraft designs**
 - New spacecraft designs added via On-Ramps
- **Rapid Delivery Order awards via quick procurements**
 - DO awards in 6 to 8 months (draft RFO thru DO award)
- **Program Risk Reduction**
 - Knowledgeable and experienced RSDO facilitators
 - Proven spacecraft designs that are modifiable
 - Paid studies to refine mission requirements
- **Fixed Price Awards with Full DO Insight**
 - Final vendor selection via competitive procurement process
- **Refund/Replacement Clause requirements**
- **Full service: s/c build thru on-orbit checkout/acceptance**



The RSDO Team



Bruce Milam (Chief), Leslie Adams (CO), and Cynthia White (Lead CO)