

Questions	JPL Response
Proposal Instructions	
Sect 2.1.4.1. 1. How does the resource margin description contrast with the description requested in Sect 2.1.1.1 (“Describe the capability...to accommodate mass and power budget growth”)	Paragraph 2.1.4.1 requests a complete description of resource margins which is more extensive than just mass and power. Paragraph 2.1.1.1 targets only mass and power.
Sect 2.3.5 (and others) 2. Is a draft of the project policies available?	JPL expects to place this on the web site no later than 4-6-01 (with a goal of 3-30-01).
1) (starting on P. 11 of 31), Para. 2.1.1.4, 2.3.22, and 2.3.2.4 are missing in the sequence. Also, Para. No. 2.3.5 heading is repeated but the material discussed is different.	Paragraph numbers are changed. Paragraph 2.3.5 is re-numbered.
2) The preamble to the Volume 3 cost instructions (page 17) states that “the 3 cost proposals should add together for the total cost to complete the effort.” Does the Government desire a total cost for the entire effort in each of the 3 volumes?	No. The preamble has been modified to state that the sum of your three cost proposals will equal the total cost to complete the effort. JPL will calculate this sum.
3) The cost volume instructions (Sec 3.1, page 18) state that in preparing the cost elements breakdown, “labor should be proposed by labor grade and work hour, not work month.” However, the following sentence states “Include a headcount in the time phasing,” which appears to conflict with the previous instruction. Please clarify. Does the Government actually desire personloading in both hours and in work-months?	Yes. But labor cost should be calculated by multiplying proposed labor hours by hourly labor rates for each labor grade. Sec 3.1 of the Cost Instructions for Phases A/B, C/D and E has been modified to clarify this distinction.
4) Page 18, par. 3.1, end of first sentence. Change to read: “...WBS described under item 3.3 below.” Rationale: item3.3 describes the WBS, not item 3.2 as stated.	Noted and corrected.

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<p>5) Page 19, par. 4.4.1, Page 25, par. 4.4.1, Page 29, par. 4.4? 1 Travel and Relocation. Request that RFP allow travel cost be estimated as a percentage of direct labor costs for each phase. Rationale: The precision of a historical travel percentage is commensurate with our ability to accurately predict travel and its overall impact on total cost. Detailed estimates of the number of trips, number of people, number of days, cost per trip etc. is an overly precise and time consuming method to estimate an inherently imprecise cost like future travel. This is especially true for travel that may take place years in the future during Phase C/D and E.</p>	<p>The requirement will remain as stated.</p>
<p>6) Page 21, par. 6.2. Procurement of Long Lead Parts. This paragraph of the Cost Instructions for Phase A/B Proposal requires bidders to include detailed costs and funding profiles for long lead Phase C/D parts. It conflicts with second introductory paragraph at the top of Page 17 where it says that the Phase A/B costs are not to include any costs for the long-lead Phase C/D parts. Also, the first paragraph of the Phase C/D instructions on Page 23 says that Phase C/D must include all costs for long-lead parts. In addition, Page 26, par. 5.0 instructs bidders to not include long lead funding profiles in the Phase C/D proposal. Please resolve these conflicts.</p>	<p>Pages 17 and 23 are correct. The RFP has been modified to delete par. 6.2 in Volume 3, and to revise par 5.0 in Volume 4 to require profiles for long-lead funding by part type.</p>

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7) Page 23, par. 3.1, end of first sentence. Change to read: "...WBS described under item 3.3 below." Rationale: item3.3 describes the WBS, not item 3.2 as stated.	Noted and corrected.
8) Page 29, par. 3.2 last subparagraph before para. 4.0. Change to read "... Above for the Phase E proposal (as appropriate)..” Rationale: the subject is Phase E not Phase A/B.	Noted and corrected.
9) Phase E is a cost plus award fee contract. Should the bidder propose a plan?	Yes.
(1) Volume 3 and 4 instructions. Between Phase A/B and Phase C/D, the WBS structure changed in that ATLO became 05.11 from 05.10 and Special Studies changed from 05.11 to 05.12. However, in Phase C/D there is no use of 05.10. Is this a typo or done by intent? If by intent, what is the usage of 05.10 in Phase C/D? If a typo, would it be possible to keep these the same from Phase A/B to Phase C/D to minimize confusion?	The Phase A/B WBS is correct (ATLO is 05.10). The WBS for both Phase A/B and C/D will be the same. There may be minor changes to the WBS by the time that the final RFP is released.
(2) Volume 4 instructions. In Phase A/B WBS 05.10.01 and Phase C/D 05.11.01, the A for assembly has been left off. Is there a specific WBS in which you would like to collect Assembly costs? Also, Test Operations are not specified, whereas Test Engineering is. Should it be combined with the Test Engineering costs? Or should this be combined with Orbiter/Payload Integration and Test, or is this strictly for I&T activities between the orbiter and payload?	The "A" is ATLO was inadvertently deleted during final editing. The first cost element within ATLO (05.10.01) is entitled "ATLO Engineering". System level assembly costs would nominally be in 05.10.04 Orbiter/Payload Integration and Test. Test operations would nominally fall under 05.10.02/.03/.04/.05 as appropriate.

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<p>(3) Volume 5 instructions. Are the WBS details for Phase E intended to be the same as for Phase C/D? Typically, Phase E is broken into Flight Operations and Anomaly Resolution with GDS and MOS Development as Phase C/D tasks. The paragraph after the WBS in the Phase E Implementation section addresses Phase A/B. We assume this should read Phase E.</p>	<p>The WBS structure to be contained within the RFP for Phase E is under revision. The final WBS structure will be provided as part of the final RFP. Your assumption is correct - the paragraph after the WBS should read Phase E.</p>

Exhibit 1 – Orbiter Requirements	
<p>2. Reference Mission Description "... the imaging instruments will acquire data from a cross-track orientation up to 30 deg from nadir." What is required duration of cross-track pointing?</p>	<p>approximately 1 minute</p>
<p>4.12 Aerobraking Deceleration Detection "The orbiter shall be capable of sensing deceleration during the aerobraking pass over the range of 1 to 1×10^{-5} m/sec² with a sampling rate of 1 Hz and an accuracy of +/- 20%." Is there a typo in specifying the range (possibly a missing exponent after the first "1"?)</p>	<p>No; However this requirement is being re-written and will be available 3/30.</p>

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<p>4.13, 4.16 and 4.18 appear to conflict with regard to orbit strategy. Please clarify.</p>	<p>REWORD TO 4.18 PROVIDED AS A GENERAL ANSWER Clarification of Section 4.18 "Total Required Translational DV Budget"</p> <p>Section 4.18 specifies the required translational DV for the nominal mission. The DV table shown in Section 4.18 does not include the additional DV necessary to accommodate finite burn losses or orbiter attitude maneuvers. As such, it does not include the attitude control propellant for the 10 year mission life.</p>
<p>4.19 Maneuver Execution Errors "The orbiter shall produce maneuver execution errors less than those specified in below." Is there a typo omitting something before the last word?</p>	<p>There is a typo in the sentence; it should read "The orbiter shall produce maneuver execution errors less than those specified in the table below."</p>
<p>4.19 Maneuver Execution Errors Are the numbers in the table absolute limits or statistical (1 or 3 sigma for example)?</p>	<p>The maneuver execution error terms are independent statistical quantities and are specified to the 3-sigma level.</p>
<p>6.16.4 – Aerobraking Phase – this section reads as though the MARCI WA camera will be used for aerobraking only. Is this correct?</p>	<p>The MARCI WA will be used during aerobraking and also during the primary science phase.</p>
<p>6.16.5 – Primary Science Phase – The first sentence appears to conflict with bidders brief and video information about the simultaneous operation of payloads. Please clarify.</p>	<p>Please expand on your question. The requirements in Exhibit I section 6.15.5 are correct.</p>

Questions	JPL Response
Exhibit I, Paragraph 1.4.2. Payload mass includes booms, radiation shields, etc. Are these planned to be provided GFP? If not, are you going to provide a mass allocation for these items?	Booms, radiation shields, etc that are necessary to accommodate the payload element requirements [FOV, etc] are to be provided by the spacecraft contractor. Booms, radiation shields, etc that are for the convenience of the payload element [e.g. GRS boom on MGS] will be GFP and counted against the Payload mass allocation.
Exhibit I, Paragraph 2. Indicates that we are to capture into a 35 hour orbit. Bidder's Conference chart MDS-3 indicates a 35 hour or less. Which is correct ?	The requirements in exhibit I are correct, the nominal capture orbit period is 35 hrs.
Exhibit I, Paragraph 4.12. Is the +/-20% intended to be 3 sigma?	this requirement is being re-written to be more clear and will be available by 3/30
Exhibit I, Paragraph 4.13. This paragraph states that the orbiter shall be capable of operating within specification in the 200 x 400 km orbit within the range of orbital elements shown in the following table. The table describes a specific set of orbital elements on a specific epoch date, however, what is the "range" that is referred to in the preceding sentence? This situation also applies to the subsequent description of a 400 km near circular orbit.	This requirement is being re-written in exhibit I to clearly describe the range of orbital elements. The re-written requirement will be available by 3/30/01. The apoapsis will remain close to 400km while the periapsis range will be from about 200 to 350 km.
Exhibit I, Paragraph 6.1. Will JPL specify the RFI requirement for Electra?	The EMC compatibility design and test requirements are in section 2.3 of the Preliminary Environmental Requirements & Estimates document, JPL D 20241
Exhibit I, Paragraph 6.2. The Visible-Near Infrared Spectrometer shows optics and one electronics box. However, the .STEP file, provided on the Instrument Interface CD, shows two smaller electronics boxes. Which is correct ?	The .STEP file is correct and Exhibit I will be changed.

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Exhibit I, Paragraph 6.4 and Bidder's Conference Package, whm-5. Will JPL provide additional clarification of Radar RFI requirements?	The EMC compatibility design and test requirements are in section 2.3 of the Preliminary Environmental Requirements & Estimates document, JPL D 20241
Exhibit I, Paragraph 6.15. Does 3-sigma requirement of .1 mrad apply to all mission phases or just mapping? If just mapping, is there a requirement for the other phases? Same question for stability. During the in-bound Doppler experiment are there special HGA pointing requirements? Is it simultaneous with HRI cross-track imaging?	Section 5.1 of exhibit I, states that the orbiter shall meet the pointing requirements in 6.15 during the primary science phase and the relay phase. There are no JPL imposed requirements for pointing during other mission phases. There are no JPL imposed requirements for HGA pointing to gather in bound doppler signals. There are no requirements to support cross track imaging while supporting in bound doppler signals.
Does the Radar Antenna deploy as a telescope from the ends of the stowed volume?	yes
Section 4.19 Are the terms in the table additive? i.e. If there was a 0.10 m/s magnitude or pointing error, does this mean that the total magnitude or pointing maneuver execution error can be 0.02 m/s + 2% (0.10 m/s)?	The maneuver execution error terms are independent statistical quantities. Each component of the maneuver execution error is applied separately to the desired delta-V. Therefore it is possible to have a 2% proportional error and a 0.02 m/s fixed error at the same time, leading to a total error of 0.02 m/s + 2%(desired delta-V). However, each of the limits is a 3-sigma limit (99.87%), so the probability of both the fixed and proportional errors reaching their limits on any particular firing should be extremely low (about 2E-06).
Section 6.15 Does the "nadir relative attitude knowledge" stated in the table refer to how well the orbiter ADCS system models the 1 rotation / orbit dynamics excluding navigation errors?	the nadir attitude knowledge is how well we know the vector from the s/c to the Mars surface normal. One component of that is the rate at which the nadir attitude frame is rotating with respect to inertial space. For elliptic orbits, that rate is not constant and must be modelled.

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Section 6.15.1 Re: "slewing to the cross track orientation" Can you specify the slew rates and settling time explicitly?	no; the needed duration of the cross track pointing orientation is about 1 minute
Section 4.18 Does the orbit maintenance allowance accommodate a 10 year mission? Do these allocations include the DVV margins?	<p>REWORD TO 4.18 PROVIDED AS A GENERAL ANSWER Clarification of Section 4.18 "Total Required Translational DV Budget"</p> <p>Section 4.18 specifies the required translational DV for the nominal mission. The DV table shown in Section 4.18 does not include the additional DV necessary to accommodate finite burn losses or orbiter attitude maneuvers. As such, it does not include the attitude control propellant for the 10 year mission life. The delta V budget in 4.18 includes the DVV margin.</p>
Section 5.3 & 5.4 Is there a distinction between the orbiter state data requested in Section 5.3 and engineering telemetry described in Section 5.4?	yes; 5.4 requires eng telemetry that may be in addition to that required to characterize science in 5.3
Section 5.9.3 Is there a number of commands or minimum command file size requirement for storage capability?	There is no minimum command file size. We require 2 MB memory storage for payload commands.
Section 5.9.4 Does this section state that the orbiter shall provide capability for all of these coding options?	yes
Section 5.10.3 Must the orbiter transmit the emergency downlink signal following the detection of every fault condition?	no; the implementation of this requirement is dependent upon your fault protection and spacecraft design

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Section 5.10.4 Is it really intended that the orbiter enter a 'safe condition' following the detection of every fault?	no; Safe mode is to be used for those serious fault conditions that are beyond the on board fault management capability to recover from.
Section 6.2 Are there any restrictions on the placement and configuration of the SSSR other than ensuring system compatibility with the 800 V/m and nadir perpendicularity requirement?	no, [note new electric field spec in section 2.3 of the Preliminary Environmental Requirements & Estimates document, JPL D 20241]
Section 6.2 The videotape presentation made by Jeff Umland verbally indicated a tip to tip length of 15 m, but the specification states 7m. Please advise.	The requirements in Exhibit 1, section 6.2 are correct.
Section 6.2 The bidder's conference videotape describes a payload (Submillimeter Atmospheric Sounder) that is not addressed in the Exhibit I requirements. Please advise.	The requirements in Exhibit 1, section 6.1 are correct.
Section 6.3 Document states that the required payload power is 200 Watts on orbit including all reserves. Does this mean that we do not have to carry additional payload power margin?	yesmargin additional to the 200 W is not required
Section 6.4, Table The FOV of the SSSR is NA. In the bidder's conference materials, the FOV is defined as omni-directional. Please clarify.	omni directional is more correct
Section 6.4 Do the Electra Zenith and Nadir antennae have to be collocated?	no
Section 6.5 This section states "All serial interfaces from Orbiter to Payload shall be electrically isolated". Is this isolation to be on the orbiter, the payloads, or both? Also, which side supplies the isolation power or is it a separate power supply?	Both sides of the interface should be isolated. There should be separate power supplies for each interface device. Isolation implies separate ground planes which can only be achieved with separate secondary power supplies.

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Section 6.8 What is meant by the word “programmable”? Are these interfaces isolated?	Programmable means that each signal should be capable of serving as either an input line or an output line. Individual card level pin programming selection between input and output would be adequate for each line, though "software" or register level programming should also be acceptable if that is easier to do. Yes, these interfaces must also be isolated.
Section 6.9 This statement seems contradictory – “provide a minimum of 20 MIPS” and later “the processor shall be matched so that the effective performance is 20 MIPS”. I assume that what is meant is that the payload processing capability shall be at least 20 MIPS effective. (Effective defined as the aggregate memory, I/O, CACHE, and bus interactions.)	your assumption is correct
Sect. 6.9 Data Processing Capability Does the 20 MIPS include margin? Presumably, the command sequencing described is strictly payload commands. Please confirm.	The 20 MIPS does include margin. Yes, the command processing is for payload commands.
Sect. 6.16.3, Para 2 What are the Optical Nav Cam data downlink requirements (rate and volume)?	The op nav camera experiment is not intended to "drive" the telecom or data storage design, i.e. it will accommodate itself to the spacecraft capability.
16. In paragraph 6.14, do we expect to have T-O purges?	NEW - Yes (according to the latest information available from NLS).
Exhibit II - Applicable/Reference Documents	
1) The MRO Project Safety Plan, MRO Project Policies Plan and MRO Risk Management_Plan (all TBD) are not on the MRO website. When will they be available?	The Safety Plan will be posted by 3-23-01. The Project Policies and Risk Management Plans will be posted by 4-6-01 (3-30-01 as a goal).

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<p>Mission Assurance Plan - Section 4.2.15 - this section states that A-basis allowables shall be used for pressure vessels and for metallic structures. Vendors for propulsion tanks verify to an S-basis in lieu of A-basis. Will this require a waiver or is it an acceptable substitute?</p>	<p>TBD.</p>
Exhibit IV - Mission Operations Requirements	
<p>1. Exhibit IV, Figure 1. Should the SCT in Figure 1 be changed to the OET as defined in Paragraph 3.1.3?</p>	<p>Yes.</p>
<p>2. Exhibit IV, paragraph 3.1.3. Includes two subparagraphs titled K.</p>	<p>Corrected.</p>
<p>Exhibit IV, Paragraph 3.2.5b. States OET provides AMD reconstruction to Nav Team. This is different than Odyssey. Is that the intent?</p>	<p>The intent is for the OET to report every Delta-V event during an AMD, a TCM, an ACS maneuver, or an aerobraking drag pass to the Nav team in a timely manner. The Delta-V's are assumed to be constructed either onboard MRO or on the ground from each thrust pulse in conjunction with attitude information from engineering telemetry.</p>
Exhibit V - Government Furnished Property	
<p>1) What price will JPL assign to the optional GFP items?</p>	<p>The two GFP items listed as optional are the TWTA and HCD ASIC. The TWTA ROM price and delivery information will be provided with the final RFP. If the contractor elects to provide the TWTA, JPL will make an adjustment to the probable cost. JPL will provide the ASICs without establishing a price (i.e. the contractor's probable cost will not be adjusted either way).</p>

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Exhibit VI - Orbiter I/F Roles and Responsibilities	
Para 17 1. We assume that "BCE" means Bench Checkout Equipment.	Yes - BCE refers to Bench Checkout Equipment.
Page 18 2. This figure did not translate properly. Please provide a readable version.	There are no figures in Exhibit VI.
Section 2.1.3 Science Investigators (SIs) / Payload Providers 3. Page 6, Item 4 and Item 5 appear to be in conflict. Who supplies ALL of the orbiter / payload interface connectors?	Yes - there is a conflict between 2.1.3, paragraphs 4 and 5. JPL intends that all the orbiter - payload connectors be supplied by the orbiter contractor. Paragraph 2.1.3, paragraph 4 will be modified.
4. Section 2.1.3 - Page 6, Item 5 states "Incorporate the supplied electrical connectors and thermal control hardware into the payload design and hardware as specified in the payload-orbiter ICD." If the payload provider is supplying connectors for use on the orbiter side of the payload / orbiter interface, are they also supplying connectors for the following uses: - Break Out Box (BOB) cables - Spacecraft bus simulator use	Consistent with the above answer, the orbiter contractor is responsible for providing all of these connectors. Exhibit VI will be corrected.
5. Section 2.1.3 - Page 6, Item 7 states, "Develop the payload-related software, and as required, test equipment." Is it anticipated that any payload-related software be resident in the orbiter C&DH?	JPL anticipates that there will be some payload software residing in the orbiter data processing system.

Questions	JPL Response
Section 3.1.1, Item 8 and 3.1.2, Item 3 6. Do we have more definition on what the "SDST GSE" includes so we can determine what type of RF Test Console we need to provide?	The specific test equipment provided with the SDST will be the standard Motorola SDST GSE. Additional information can be provided if needed.