

TCTB, LLC NON-PROPRIETARY VERSION

UNSOLICITED PROPOSAL

TCTB, LLC



May 21, 2019

To:

China National Space Administration (CNSA), 8A Fucheng Road, Haidan District, Beijing, China 100048, ATTN: Zhang Kejian, Administrator [hard copy, and electronic to webmaster@cnsa.gov.cn]

China National Space Administration (CNSA), 8A Fucheng Road, Haidan District, Beijing, China 100048, ATTN: Department of Foreign Affairs [hard copy, and electronic to webmaster@cnsa.gov.cn]

State Space Corporation ROSCOSMOS, 42, Schepkina st., Moscow, Russia, GSP-6, 107996, ATTN: Dmitry Rogozin, Director General [hard copy, and electronic to info@roscosmos.ru and ranyuk.em@roscosmos.ru]

State Space Corporation ROSCOSMOS, 42, Schepkina st., Moscow, Russia, GSP-6, 107996, ATTN: Russian Ministry of Foreign Affairs [hard copy, and electronic to info@roscosmos.ru and ranyuk.em@roscosmos.ru]

National Aeronautics and Space Administration (NASA), Headquarters 300 E. Street SW, Washington, DC 20546, ATTN: Jim Bridenstine, Administrator [hard copy, and electronic to info-center@hq.nasa.gov]

United States National Space Council (NSC), c/o The White House, 1600 Pennsylvania Ave., NW, Washington, DC 20500, ATTN: Scott Pace, Executive Secretary [hard copy, and electronic to hq-uag@mail.nasa.gov]

National Oceanic and Atmospheric Administration, U. S. Department of Commerce, Office of Space Commercialization, 2518 Herbert C. Hoover Bldg., 1401 Constitution Ave. NW, Washington, DC 20230, ATTN: Kevin O'Connell, Director [hard copy, and electronic to space.commerce@noaa.gov]

Dear Sirs:

TCTB, LLC, offers to actively remediate orbital debris, as a privately-owned prime contractor on behalf of the People's Republic of China (China), the Russian Federation

(Russia) and the United States of America (U. S.), under three separate but interdependent prime contracts, utilizing subcontractors competitively selected by TCTB, as further described in this Proposal.¹ [REDACTED]

Why now? Orbital debris has reached a tipping point where waiting to act is no longer a prudent option if future use of space is to be preserved. Experts have concluded that a future single collision of two uncontrolled high mass objects in Low Earth Orbit (LEO) followed by the inevitable fragmentation and follow-on collisions of other objects could quickly become unstoppable and irreversible, resulting in a debris cascade and total loss of use of entire regions of space for hundreds of years. Forecasting the exact date when this will occur is not possible but can be projected statistically – in fact, many experts are surprised it has not already happened.

When the Kessler Syndrome² was first predicted in 1978, technology did not exist to address the problem. Fortunately, today due to the efforts of numerous individuals and institutions³ across the world, there is broad consensus on targets for remediation (e. g., high mass derelict objects in sun-synchronous orbits in LEO), and there is a wide range of mature and maturing technologies developed by governments and private industry capable of tackling the problem in creative, safe and economically feasible ways. In fact, China, Russia, the U. S. and other countries use remediation technology today in space, although for other purposes.

Space is a vastly different place today than it was in 1957 when Sputnik was launched. Space has become an international commercial marketplace, and more and more governments use space for a variety of reasons in fulfilling their national purpose. Space is a shared and increasingly crowded resource that the world relies upon, and it is a key element in humanity's evolution and search for meaning in life.

Why three countries? China, Russia and the U. S. are legally responsible for virtually all the debris in space, and they have jurisdiction over or rely on more space-based assets than any other country, for military, civil and commercial purposes. They have the most future opportunity to gain by remediation, as well as the most to lose by failing to avert the impending cascade. In a Westphalian world, they each aspire to leadership in space.

¹ TCTB, LLC is a limited liability company organized under Texas law in Houston, Texas, the home of America's manned space program. TCTB is owned by Chuck Dickey. Mr. Dickey is the former Deputy General Counsel for Lockheed Martin Space, and a member of the International Institute of Space Law (IISL). His biography is attached as Exhibit 1. An Abstract describing the conceptual basis for TCTB's mission, and the rationale for its establishment, is attached as Exhibit 2. The Abstract has been accepted by the International Astronautical Congress (IAC) for oral presentation in Washington, DC, USA in October 2019, during an IISL Colloquium on the Law of Outer Space, Session 4 ("Space Traffic Management: From Space Situational Awareness and Space Surveillance and Tracking to Developing Rules of the Road"). This Proposal is based on ideas expressed in the Abstract.

² 1. Kessler, D.J. and Cour-Palais, B.G., Collision Frequency of Artificial Satellites: The Creation of a Debris Belt, *Journal of Geophysical Research*, Vol. 83, No. A6, 2637-46 (1978). See also, Kessler, D. J., Johnson, N. L., Liou, J.-C., Matney, M., *The Kessler Syndrome: Implications to Future Space Operations*, American Astronautical Society, AAS 10-016 (2010).

³ Among these institutions is the Inter-Agency Space Debris Coordination Committee (IADC). Formed in 1993, it includes the space agencies of China, Russia and the U. S.

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By partnering with TCTB to clean up orbital debris, China, Russia and the U. S. can demonstrate world leadership and, more importantly, they will establish a cooperation spiral and a powerful precedent for international harmony in space for the benefit of all mankind, without compromising any of their respective national interests.

Why TCTB? Although many technical solutions stand ready to remediate certain types of debris, **legal, political, national security, economic and funding issues** have prevented their implementation to date. Each of these impediments can best be overcome by China, Russia and the U. S. acting together through a small private company that is independent from the three countries.⁴ Also in furtherance of resolving these issues, the company would be independent from, and not a competitor to, companies offering remediation technologies. It would identify debris targets and select the best technologies to accomplish remediation. It would contract with China, Russia and the U. S. (“Three Country”) for project funding, and subcontract with the selected remediation companies. As an independent prime contractor, it would insulate and protect each country’s independent interests, and it would stand between the countries and for-profit remediation companies, as a “Trusted Broker”.⁵

Contracting with all three countries responsible for most of the debris would effectively mitigate **legal risks** which to date have contributed to inaction.⁶ Acting through a “Trusted Broker” would relieve **political and national security concerns** embedded in the debris or in the selected remediation technology.⁷ Centralizing in, and ceding all remediation decisions to, one company acting in the best interests of space remediation would result in the **most cleanup for the least amount of money** and would provide a means to **share the cost burden** among the three countries.⁸ Each country could recoup its share of remediation costs through taxes, user fees or other mechanisms. Finally, working through a private entity vested with responsibility for decision-making could significantly streamline the bureaucracy inherent in inter-governmental relations.

Under this construct, the three countries would, in effect, be acting as “venture capital” sources to achieve what could not otherwise be achieved acting alone or together as sovereign nations.

⁴ TCTB is willing and able to reestablish itself in a non-aligned jurisdiction such as Luxembourg if greater independence is desired by the three countries. Doing so would require consideration of the risks and benefits.

⁵ To be clear, no bilateral contracts between countries, or direct country-to-country relationships, are contemplated. However, the need for political coordination among the three countries is acknowledged. Each country must also determine whether additional internal legislative approvals are required for interaction among countries, and for any new funding authorizations.

⁶ Under international law, jurisdiction (ownership) and liability considerations constrain active debris removal (ADR). Under separate prime contracts with TCTB, China, Russia and the U. S. would each consent to the removal of each other’s debris, and they would address ADR liability concerns through insurance/self-insurance/indemnity/party cross-waiver provisions in the prime contracts and flowed to the subcontracts. The project could be accomplished within the existing international space law framework.

⁷ Non-disclosure agreements and firewalls within TCTB and the ADR subcontractors would protect sensitive information of each country from disclosure to the other countries. TCTB is a private entity and has no political objectives, so its use of a grappling arm or laser in space would not threaten any country. No classified targets are envisioned. Subcontractors would be required to obtain any necessary export licenses.

⁸ Viewed from a number of perspectives, there is little doubt the three countries are best positioned to undertake ADR. Cooperating, and authorizing a world-wide competitive process for TCTB to select subcontractors ensures fairness and maximum economic utility, and cost sharing under the prime contracts could equitably spread the burden among the countries.

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TCTB's costs are expected to be minimal and incurred solely in furtherance of the common objective, as authorized contractually by the three countries.

TCTB is the only company of its kind in the world. It was formed to accomplish the mission outlined in this Proposal. Its founder is an expert with years of experience in space law, corporate governance structures, government contracts and competition.

A diagram of the prime contracting and subcontracting relationships is attached as Exhibit 3.

Proposal

TCTB offers to enter into three separate but interdependent multi-Phase “Cost-Plus Fixed Fee” prime contracts, one with each country, using each country’s standard form space procurement contract, to remediate orbital debris. Independent and separately exercisable Phases (Options) cover development and negotiation of the prime contracts, target identification, subcontract development and development of the subcontract proposal evaluation process, competition and award of the subcontracts, performance of Active Debris Removal (ADR) subcontracts, and special projects. Separate contracts with gated Phases and country termination rights allow each country to control the pace, scope and cost of their participation in the work.

While relying on each country’s standard procurement contract, each prime contract will also contain negotiated special provisions, consistent across all three contracts, addressing consent, non-disclosure obligations and firewalls, risk allocation (e. g., indemnity, insurance/self-insurance, party cross waivers), prime contract interdependence, termination for convenience, cost sharing, audit rights, oversight/insight of ADR subcontracts, flow down of certain terms to ADR subcontracts, any necessary export authorizations, and common purpose/interpretation declarations. Each country and TCTB’s signing a contract, coupled with exercising an Option for Phase 1 and providing associated funding, by one or more countries, will initiate activity. Phase performance periods may overlap, and Phases may be exercised separately or jointly in any sequence.

I. Country Prime Contracts – Let’s get started!

Phase 1 – Prime Contract “Definitization”: The Statement of Work (SOW) for Phase 1 covers TCTB’s costs to “definitize” (i. e., negotiate) the details of the prime contracts with each country (e. g., travel and meeting expenses, supplies, and any costs to retain experts and support staff).⁹

[REDACTED]
[REDACTED] Phase 1 is expected to take 3 months to complete. Deliverables include all prime contract documents.

[REDACTED]

⁹ To conserve costs, some support tasks may be performed by “seconded” country personnel, subject to approval by TCTB and execution of appropriate non-disclosure and firewall agreements. For example, negotiating in English could minimize the need for translation services.

II. Target Identification – Let’s decide on targets!

Phase 2 – Target Identification: The SOW for Phase 2 includes TCTB’s costs to work with the three countries to develop initial ADR targets (e. g., travel and meeting expenses, supplies, and any cost to retain non-country provided technical experts). Much work in this area has already been accomplished by others – Phase 2 will build upon that. [REDACTED]

Phase 2 is expected to take 6 months to complete. Deliverables include the Initial Target Ranking Document^{10,11}

III. Request for Proposal (RFP) and Subcontract Development – Let’s prepare to engage industry!

Phase 3 - RFP Development: The SOW for Phase 3 includes TCTB’s costs to work with the three countries to develop an RFP for industry seeking proposals for ADR of one or more targets identified in the Initial Target Ranking Document. [REDACTED]

[REDACTED] Phase 3 is expected to take 6 months to complete. Deliverables include a Draft RFP.

Phase 4 - Subcontract Development: The SOW for Phase 4 includes TCTB’s costs to work with the three countries to develop the terms of the ADR subcontracts.¹² [REDACTED]

[REDACTED] Phase 4 is expected to take 6 months to complete. Deliverables include a Draft Model Subcontract which will be included in the industry RFP.

IV. Subcontracts: Competition and Award – Let’s engage industry!

Phase 5 - Subcontract Competition: The SOW for Phase 5 includes TCTB’s costs to conduct a competition for ADR of initial targets. [REDACTED]

[REDACTED] Phase 5 is expected to take 6 months to complete. Deliverables include evaluation and preliminary selection of an awardee.¹³

¹⁰ Phase 2 could also include a Task to identify longer range ADR targets, in contemplation of follow-on ADR projects. It is anticipated the Initial Target Ranking Document will contain significantly more targets than could be captured in one single ADR project/subcontract.

¹¹ It is anticipated that initial targets will be limited to unclassified space objects under the jurisdiction of the three countries and identified in publicly available satellite catalogs.

¹² The ADR subcontracts are expected to be “Firm, Fixed Price” although they could contain cost reimbursement provisions depending on technology maturity, scope, and a number of other factors that could influence risk. “End to end” coverage (e. g., ground support, propulsion, proximity operations, rendezvous, docking, and de-orbit, reentry or graveyard maneuvers) is contemplated. Subcontractors will also be expected to propose and be responsible for any necessary export licenses, insurance and launch service costs.

¹³ There is wide latitude for creativity and opportunity in developing the scope of the RFPs and the evaluation criteria to judge submitted proposals. For example, broadening the RFP to allow proposals for an unspecified number of high-ranking targets on the Initial Target Ranking Document could expand the variety of proposals to be expected. Evaluation criteria and award decisions could be similarly widely framed to obtain “best value” ADR subcontracts. Subcontractors will bear all proposal costs.

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Phase 6 - Subcontract Award: The SOW for Phase 6 includes TCTB's costs to negotiate and sign a subcontract with the awardee. [REDACTED]

[REDACTED] Phase 6 is expected to take 6 months to complete. Deliverables include a signed subcontract between TCTB and the awardee.¹⁴

V. ADR - Let's do it!

Phase 7 - ADR: The SOW for Phase 7 includes TCTB's costs of managing the initial awarded subcontract. [REDACTED]

[REDACTED] Phase 7 is expected to take 1 year or more to complete. Deliverables include periodic Progress Reports.

VI. Future Activity - What next? Exciting Possibilities!

Phase 8 - Next Steps: The SOW for Phase 8 includes TCTB's estimated costs and negotiated fees for follow-on ADR projects and other special projects.¹⁵

Summary, Conclusion and Offer

TCTB acknowledges that each country has to independently review and decide whether to accept this Proposal through their respective diplomatic and procurement channels. As part of that review and approval process, in-country Agency designation and funding sources (for research and for ADR) may need to be identified, which may require further legislative approvals.

In summary, China, Russia and the U. S. are responsible for virtually all the debris in space, and they are responsible for or rely on more space-based assets than any other country, for national defense, civil and commercial purposes. They have the most future opportunity to gain by remediation, as well as the most to lose by failing to avert the impending cascade. By contracting with TCTB to clean up orbital debris, they could establish a powerful precedent for cooperation in space for the benefit of all mankind, without compromising any of their respective national interests. But even if only one country decided to proceed, and even if only for the initial Phases of work, it could validate the business case that TCTB believes exists today for ADR, and it would be a bold and timely leadership step in the right direction.

¹⁴ Subcontracts will be contingent upon country provided funding to TCTB covering the ADR subcontract price. Privity of contract principles will limit the availability of legal remedies by the subcontractors or prospective subcontractors against the three countries.

¹⁵ Once ADR has begun, the possibilities are exciting! Besides follow-on ADR projects, there are a number of interesting "adjacency" projects, commercial or civil in nature, that TCTB or its subcontractors may propose which could help defray costs of ADR, as well as open up new commercial opportunities. For example, a satellite operator might approach TCTB or its subcontractor about repairing a satellite during an ADR project. The resulting servicing contract between TCTB and the satellite operator, if approved by the countries, could provide a share of the ADR-related savings. Adding debris targets under the jurisdiction of other countries is also possible in later Phases, further defraying costs and expanding the scope of international country participation.

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Acceptance of this offer may be accomplished by each country by issuing a "Letter" contract to TCTB for mutual signatures to begin work on at least Phase 1, and by providing the necessary funding to begin work. TCTB encourages you to contact Chuck Dickey to discuss the framework and details of this Proposal, and to answer any questions.

Chuck Dickey

TCTB, LLC



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