



TETRAD Institute of Complex System Dynamics
presents

New Horizons Beyond 2020 Vision

Request for Proposals

Introduction and Summary of Opportunities

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TETRAD Institute of Complex System Dynamics hereby announces a suite of collaborative opportunities for participation by individuals and institutions within a set of ten sponsored projects. These project topics span a range of basic research and applications development, encompassing multiple closely-coupled domains of science, mathematics, and related technologies. There are presently several opportunities for participation, beginning in 2021, within several aspects of the projects, all of which possess substantive and reliable forms of support for participating individuals and organizations.

This document provides introductory public information regarding the project subject matter, required qualifications, budgets, schedules and other pertinent data. Additional detailed information on each particular project offering and specific terms for engagement as a project team member within one or multiple projects is available upon direct request.

I. Overview of the Program

New Horizons: Beyond 2020 Vision

This is a program conceived and developed by TETRAD Institute of Complex System Dynamics (“the Institute”, “TI”) in conjunction with an association of partners, sponsors, and supporters from within public and private sectors of society. All support including funding is through grants and contributions

to the Institute and free of obligation to any private, public, academic, corporate or governmental sponsor. Program management is conducted by TETRAD Institute in a manner complementary and customary for research projects in the sciences and humanities.

The New Horizons Program addresses significant areas of need for multi-disciplinary, multi-cultural, multi-national collaboration. Each of ten project topics is designed to achieve, within reasonable near-term future months and years, a combination of theoretical, experimental and practical application-enabling results that can be employed in a variety of manners, both commercial and non-commercial, in order to solve several critical problems that currently pose not only intellectual and scientific challenges of interest but also concrete threats for destabilization of human culture and civilization.

There are ten Projects being organized, funded and supported through the Institute and comprising the overall Program, “New Horizons: Beyond 2020 Vision”. These include the maturation and delivery of four application systems that may constitute commercial products which may be offered, under terms of the Projects and the overall Program, for commercial license and with appropriate and customary forms of technology transfer and intellectual property rights management.

Persons with interest for possible inclusion and participation in one or multiple facets of the projects should request detailed information, providing a general introduction to type of interest, capabilities, and backgrounds. Further general points regarding qualifications and requirements, upcoming detailed information releases, application procedures, preliminary workshops and conferences, and other stages in the application and program development process are provided following this brief summary list of the project topics.

II. List of Projects

There are ten Projects for which detailed RFPs will be released to interested parties. These projects share similarities to previously established and ongoing Projects within the activity space of TETRAD Institute and its seven formal Programs, but there are substantive variations which will be made clear through the future detailed specifications. The name of this public program, “New Horizons: Beyond 2020 Vision”, originates from a philosophical and societal viewpoint that what we need at the present time is a new outlook on how to undertake certain types of scientific and technical projects that necessarily involve research and application, with multiple talents and skillsets, and with a longer term perspective about results and returns of economical natures, and with a deliberate emphasis upon achieving results that can be utilized successfully in many different areas of life.

The “New Horizons” imply a “going beyond” the limitations of simply “2020 vision” metaphorically, and “going beyond” the limitations of how we as a society, engaging in the “STEM” domains (science, technology, engineering, mathematics – and also medicine as well – and also different facets of the humanities in conjunction with the traditional sciences – can move beyond the boundaries of how we

have been doing things up to and through the very unique times characterized by this recent year, 2020 in the widely-used Julian calendar. As a planetary society we have come in the year 2020 to face many first-of-kind challenges through the entire COVID-19 pandemic experience, which continues even at the present, as this document is being prepared and released.

Thus, “New Horizons” is very much about New Thinking and New Action in the way we do science and technology that is often at the edge of conventional accepted thinking, and which can promise to lead us to multiple discoveries that may be rich with multiple useful applications for our future.

These are the ten Projects that comprise New Horizons:

[1] ASTRIC

Astro Terrestrial Remote Interaction and Control, and specifically, Asteroid Reconnaissance Intervention and Control. Cooperative modular multi-function robot networks capable of conducting autonomous high-fault-tolerance missions in space including performance of tasks for modification of asteroid trajectories, orbits and potential collisions with Earth.

Included is the core technology of structural components and assembly/disassembly mechanisms for ASTRIC units, known as MOSES (Modular Organic-assembly Space-based Engineering System), and HALO (High-Altitude Lift-Launch-Land Operations), an architecture for space-based operations that eliminates the need for conventional heavy rockets and reduces other engineering complexity and cost factors for launching and landing payloads to and from planetary orbit. HALO employs a relocatable platform at a very high altitude, constructed of modular pod units, for use as a waypoint base for traffic of vehicles to and from Earth and to and from space-based locations.

This project is intended and planned to grow and expand significantly within the next ten years. There will be multiple steps and stages for different teams as work progresses into system implementation.

Related background information: www.astra.tdyn.org and www.astric.tdyn.org

[2] ICMC_TBD

Immuno Cyto Molecular Computation/Communication and Topological Biomolecular Dynamics Research is focused upon two principle areas:

[a] VESID (Viral Entry Structural Integrity Disruption) – design of prophylactic and therapeutic medications for interruption and prevention of host cell entry processes via specific targeting of viral envelope topological structures. VESID is based upon topological models of cellular and viral signaling and recognition which contribute to the mechanics of infection, inflammation and immune response.

Related background information: www.intelrenaissance.com (see “VESID”)

[b] Topological order and efficiency, conformal geometries, and biosoliton dynamics within autoimmune disorders, with special attention to multiple sclerosis and dementia progressive

pathology. The medical domain of special study is that is Neuronal Electrochemical Stressors disrupting biosoliton molecular signaling and leading to accelerative demyelination and microtubule brittleness and fragmentation and the foundational stages of MS, AD and other ND disorders.

[3] Mirnova

Educational and internship programs within the arts and sciences, including four main focus areas:

[a] Content assimilation, organization and editing processes involved in the Librarium, a knowledge conservation project. The Librarium as a defined entity involves the preservation, conservation and sustenance of scientific, technical and humanities knowledge and skills for long-term future needs and in parallel for knowledge transfer to and among diverse communities of learners and active STEM developers.

[b] EcoVita Oasis - Neurophysiological Wellness Activities involving Natural Environment Experiences. This aspect of Mirnova activity is directly connected with youth education also, and with practical therapeutic derivations from the more theoretical ICMC_TBD Project. This activity also links with the IntelAgros Project.

[c] Participation in active research and development projects as interns and apprentices, within the context of personalized, mentored education that is integrated with other school programs (both direct-engagement and distance-based). Such participation is a key part of all the New Horizons Projects.

[d] Coordination and management of special merit scholarship programs for youth and adults in the arts and sciences with a focus upon physics and medicine. These scholarships are supported by a number of private and public sponsors and they are administered by TETRAD Institute with the collaboration of other project team members.

Related background information: www.mirnova.tdyn.org and www.librarium.tdyn.org

[4] CHS (Community Health Sustainability)

The integration of BioProtection practices and methods, MedAtrium mobile diagnostics and therapies, Eyrie public activity and resource management informatics and VESID medicinal solutions, tailored and optimized for specific civic and social entities. MedAtrium constitutes a highly modular and reconfigurable architecture for rapid-deployment medical diagnostics and therapeutics, oriented to large-scale public needs in epidemic, pandemic and other emergency response situations. BioProt incorporates informational methodologies, physical procedures, and social education in order to address the multi-origin, multi-agent problems of microbially-transmitted infectious disease and other health conditions through the environments of homes, schools, workplaces, and other sites of human congregation and interaction.

Related background information: www.intelrenaissance.com

[5] NeoPlexus (GHCM – Generalizable Heterogenous Computing Machine)

A biologically-inspired architecture based upon quantum biological models, incorporating principles of quantum computing and focused upon pattern discovery within very large and uncertain data spaces. Distinguished from qubit-based quantum computing based upon Turing Machine architectures. Technological implementation involves protein-polymer conjugate arrays constructed within a graphene-silicon substrate. GHCM aims, as one of its primary purposes, to enable detection and recognition of unique and similar patterns of information through a form of topological resonance at the macromolecular level, with mapping of such pattern state spaces into Turing Machine computation that may include, for specific tasks, the employment of modules that include qubit-based quantum computer machines.

Related background information: www.neoplexus.tdyn.org

[6] OASIS_Terra (Open Autopoietic Social Intelligence Synthesis)

An adaptive digital environment for social communication, collaboration, education, entertainment and trading functions, including Eyrie, a subset of OASIS focused upon geospatial public activity, health and resource management informatics, and Seldon, an open-architecture engine for predictive analytics in the modeling of psychosocioeconomic dynamics (PSED).

Within the operational space of the OASIS world environment ("Terra") are information trading functions known as Kerberos constituting a massively-distributed multi-logic encryption and privacy system for digital securities, offered in the relational structure of "private bank" client services.

Related background information: www.intelrenaissance.com (see "OASIS")

[7] IntelAgros

Modular networks of compact, portable units which provide agricultural and environmental monitoring, agricultural control of irrigation, fertilizers and pest abatement, and hybrid electrical power generation. The network may be small (single-units for small gardens and farms) or extensive for large agri-operations. Networks linked together via internet connectivity provide dynamic parallel distributed computing resources as well as power management and water/chemical management.

IntelAgros modules may be employed as singular units for homes and small gardens or as open-ended arrays that can scale up to the configuration of even the largest farm operations. At the lower end of the scale, these units can be employed in a variety of educational and psychological therapeutic settings. At any scale of deployment, the units can aid in sustaining multiplexed power sources including solar, wind, hydroelectric, battery, tidal and other forms.

Related background information: www.mirnova.tdyn.org

[8] RTD_QR (Reflexive Topological Dynamics)

A project in theoretical physics that addresses the integration and unification of quantum mechanics, general relativity and cosmology through rethinking of fundamental conceptual frameworks (e.g., space, time, mass, gravity, charge, spin), leading to a model that is consistent with observed and experimental data including the Standard Model and astrophysical observation and measurements. Emphasis is upon principles of emergent complexity and structure, conformal geometry, topological order, and processes of reflexive information flow between wholes and components. Within the developing RTD theoretical model there are emerging new perspectives upon the nature of gravity and phenomena of superposition and entanglement, the derivation of fundamental particle and force types, and a non-inflationary continuous-flow cosmology which addresses the phenomena of black holes, dark matter, dark energy and parity phenomena.

Related background information: www.primus.tdyn.org

[9] Teranod

Modified tokamak architecture for sustainable compact generation of electrical energy through hydrogen-based nuclear fusion. “Teranod” = Toroidal Energy Resonance Amplification Node. A central part of the architecture involves the formation and control of tunable solitonic plasma beams which are compressed within magnetic confinement in a non-classical “horn torus” structure. The soliton beams serve to reduce noise and heat loss as experienced in other system designs that consequently require extraordinary power sources and confinement architectures.

Related background information: www.primus.tdyn.org

[10] Cygnus

Research in topics and potential physically practical architectures for photon extraction processes (topological condensation, tensegriton particle models) that offer prospects for generation of sustainable energy convertible to other forms of energy storage and transmission, with a focus upon developing practical applications for spacecraft propulsion and similar future uses.

Related background information: www.primus.tdyn.org

III. Additional General and Introductory Points

Open Period

Detailed information for prospective partners and collaborators will be available in early January, 2021. There will commence an open period for assembling project teams that has no fixed termination date until the requisite project teams are fully defined, confirmed and work is underway.

Qualifications

Appropriate backgrounds in the relevant areas of research both theoretical and experimental as well as in communication, dissemination, publication, and education (teaching). There is a very broad range of skills that will be required for the success of each Project, some of which will require precise and even unusual (uncommon) specializations in both abstract/theoretical and concrete/practical areas. All of these will be increasingly clarified by the project teams during the initial phases of work.

Funding

There will be appropriate and sufficient funding for reasonable partner requirements in terms of staff, resources including equipment and facilities, travel, and other necessary and customary expenses for each project.

Work Locations

Specifics will be determined for each Project by the team leads in conjunction with identified and accepted (awarded) collaborators. Most project work will be conducted through a combination of activities that are remote and distance-based, with occasional onsite gatherings in the forms of workshops and special sessions requiring physical collaboration.

General Objectives

In all cases, the emphasis within each Project will be upon producing results that can be shared and employed in practical manners to serve a combination of scientific (including theoretical) and socially constructive goals. The Projects necessarily benefit from and can support traditional academic objectives but the main purpose within each Project is to produce useful outcomes. Education and training for a broad, diversified-talent, globally-distributed population is considered to be among the key useful outcomes to be achieved.

IV. Contacts

Inquiries should be addressed to:

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