INTERNATIONAL GLOBAL MONITORING AEROSPACE SYSTEMS

Toward Collaboration in The Defense of Mankind

by Benjamin Deniston, Pavel Penev, and Jason Ross

Sept. 14—Currently, mankind lives on only one planet. We are all subject to similar threats: threats that do not distinguish among nations, religions, political parties, or social classes. Irregular solar activity, earthquakes, volcanic eruptions, floods, asteroid and comet impacts — these events don't contemplate national boundaries before they strike. So why should we, when defending ourselves from them?

The conference banner. About 35 scientists addressed the three-day conference.

This was the issue underlying a scientific conference, "Space and Global Security of Humanity," held in Yevpatoria, Ukraine, Sept. 3-6, 2012, bringing together scientists from mainly Russia and Ukraine, with attendees from Kazakstan, Belarus, Germany, and Canada. The only U.S. participation came from two representatives of the LaRouche Policy Institute, Benjamin Deniston and Jason Ross, who presented the leading political, economic and scientific work of Lyndon LaRouche's movement in the United States. The conference was sponsored by a number of large Russian, Ukrainian, and international organizations,[1] but centered around the activity of the International Global Monitoring Aerospace Systems organization, IGMASS.

Although the IGMASS proposal has existed for a few years, this particular conference came in the context of Russia's Strategic Defense of Earth (SDE) offer from Fall 2011, a proposal for collaboration between the United States and Russia on both missile defense systems and defending the entire Earth from the threats posed by future asteroid and comet impacts.[2] Seeing this particular SDE proposal as an upgraded re-offer of his original 1983 program which became the Strategic Defense Initiative (SDI), Lyndon LaRouche and his associates have very publicly and forcefully supported it, most recently in the 68-page LaRouchePAC report *The Strategic Defense of Earth*.[3]

IGMASS is a proposed "system of systems," an or-

1. The State Space Agency of Ukraine, the Space Research Institute of the National Academy of Sciences of Ukraine and National Space Agency of Ukraine, the International Academy of Astronautics, the Russian Academy of Cosmonautics, the International Znanie (Knowledge) Association, and the company Russian Space Systems.

2. See "As World War Threatens, Russia Proposes SDE," EIR, Nov. 25, 2011, http://www.larouchepub.com/eiw/public/2011/eirv38n46-20111125/53-56_3846.pdf

3. For more on the SDE, see the introduction and section two of that report, "Redefining Defense: The Science-Driver Principle," available at http://larouchepac.com/SDE

The conference prepares to convene in Yevpatoria, Ukraine (right). Below, LaRouche Policy Institute representatives Jason Ross (left) and Ben Deniston with a Soviet-era space capsule, at a museum of the State Space Agency of Ukraine, in Yevpatoria.

LaRouche Policy Institute

ganization that would integrate various existing, and potentially new, satellite, air, and ground-based monitoring systems from nations all around the world, to provide a unified real-time capability to monitor the planet and the surrounding regions of space for a broad range of potential threats to life on Earth. The idea of integrating and sharing the information from satellite and other observational systems is not new, with various somewhat parallel ideas moving forward at the United Nations and other associations. While IGMASS will tap into these other systems, creating a centralized system of systems, it also sets itself apart from most others by focusing on the signals appearing *prior* to a disaster, the *precursors* of both man-made and natural disasters, and using these precursors for the purpose of *forecasting disasters before they strike*.

This crucial distinction is perhaps most evident in the forecasting of seismic events (earthquakes, tsunamis, and volcanic activity). While reductionists, fearful of the rigid structure of what is and is not accepted in academia, waste their breath (and our time) by blindly insisting that forecasting of seismic events is simply impossible, a series of presentations at this conference made clear that the science of forecasting seismic events, while not yet perfect, is moving forward, and successful forecasts have been made through a pilot project of the IGMASS system conducted by Russia over the past year. While this itself will be a revolution in the defense of mankind, IGMASS as a whole is a much broader proposal.

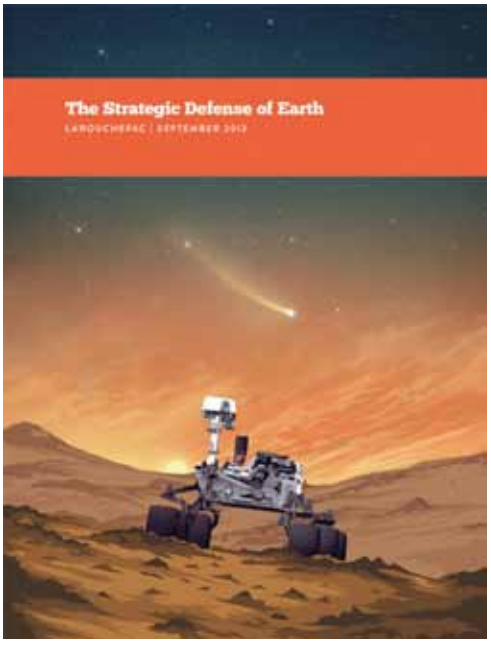
The forecasting possibilities discussed extend from the potential damage resulting from forest fires and floods (as well as man-made industrial disasters); to the threats of incoming asteroids, meteorites, and comets; to how the Sun influences seismic activity on Earth, human health, and space weather (the radiation, electrical, and magnetic fluctuations we experience on and around the Earth caused by solar and galactic activity). In order to be successful in understanding, responding to, and forecasting these terrestrial and cosmic conditions, the idea of expanding an integrated Earth and space monitoring system becomes crucial.

Before getting into the depth of what was presented at this conference, we must note in prelude that these considerations already take us to some very profound considerations. As LaRouche discussed in his recent publication, "Next, Beyond Mars,"[4] the power of mankind to advance is directly related to recognizing the failure of our sense perceptions, and understanding the qualitatively distinct power of the human mind. An integrated system of systems, monitoring the otherwise invisible processes that influence and control the conditions on our planet, becomes *a synthetic sensorium which changes the human species as a whole*. The advancement of man-

4. "SDI Today!: Next, Beyond Mars," EIR, Aug. 31, 2012, http://www.larouchepub.com/eiw/public/2012/2012_30-39/2012-34/pdf/52-58_3934.pdf

kind is directly tied to the unique power of the human mind to create new synthetic sensory systems, expanding its domain of action. IGMASS expresses a potential to consciously integrate and expand the powers of the human mind to a degree never before realized.

As the global nature of these threats illustrates — it would only take one large long-period comet to wipe out human civilization with a single impact — the continued existence of the human species depends upon casting aside our reliance upon our simply biological sense perceptions, and moving into a science-driven program to expand the power of the mind to sense and to act, all around the Earth and throughout the Solar System. As will become clear below, this means understanding the Earth as an integrated part of the Solar System, not one floating in empty space, but intimately connected through various processes which we can now come to understand for the purposes of forecasting extreme events, and, even if in a limited degree at first, begin to control.



LPAC

A Special Report available at
http://larouchepac.com/SDE

Such international collaboration in the defense of all mankind is not just a "nice" policy, but is of profound significance for the advancement of humanity as a whole. Seen from a historical vantage point, this becomes a potential coming-of-age test for humanity: *Can nations come together to overcome the existential challenges posed to all mankind*?

The Context

At the IGMASS conference, the political and economic crises currently facing the world were not overlooked by the participants. While some aspects were touched upon anecdotally in a few presentations, Jason Ross of the LaRouche Policy Institute was the most clear in addressing this reality. Citing the immediate danger of President Obama and his backers in the British Empire taking the world to the brink of thermonuclear war, Ross made clear that this is not the desire of the majority of Americans, and that there is extremely significant opposition, led by LaRouche and top levels of the U.S. military institutions, to Obama's British policy of conflict with Russia and China in particular. The current conflict around NATO's missile defense systems in Eastern Europe, and the closely related issue of trans-Atlantic economic disintegration, can both be overcome with the types of scientific programs exemplified by IGMASS and the SDE, Ross stressed.

After setting the stage, Ross followed up with a presentation of the fundamental principles of scientific progress and economic growth. As was demonstrated with the Apollo program, true science-driver programs not only generate a net profit, but produce a type of economic growth that is fundamentally transcendental in nature: growth whose value is incommensurate with the cost to achieve such growth. The new scientific and technological capabilities developed in a true science-driver program generate wealth by creating completely new capabilities within the economy, ones which simply didn't exist before. Such new platforms for the economy as a whole cannot be understood on the basis of local profit. Current arguments that these programs "cost too much money" and "cannot be afforded" are simply absurd; quite the contrary, we cannot afford *not* to pursue them.

This view of IGMASS and planetary defense from the perspective of a science of physical economics was well received by the audience, and was followed up by the second LaRouche Policy Institute representative, Benjamin Deniston, who elaborated on what types of science-driver programs will provide the greatest benefits in both improving mankind's defense against potentially hazardous asteroids and comets, and generating economic growth. Focusing on LaRouche's concept of *energy-flux density*, Deniston showed that the next revolution in our ability to act in deep space will necessarily come with the developments associated with nuclear fission and fusion propulsion systems. These do not simply provide a power source, but express an entirely new stage of the economic power of mankind, a new *economic platform*, which will upshift the entire physical-economic capability of the human species, in-

cluding the crucial issue of an expanded capability to defend against the threats of asteroids and comets.

Stimulating a fair amount of side discussion about these political and economic considerations, this pair of presentations provided an important contribution from the United States, in the midst of what was already a very high-level and provocative conference.

About 35 scientists made presentations on various aspects of the IGMASS program and related activity over the three-day event. The keynote was delivered by Prof. Anatoly Perminov, former head of the Russian Federal Space Agency (Roscosmos), and current chairman of the International Committee on the IGMASS Project Implementation.[5]

NASA/Bill Ingalls

Anatoly Perminov (right), former head of Roscosmos, keynoted the conference. Here he is shown on Oct. 2, 2009 with NASA Administrator Charles Bolden, at Mission Control Center in Korolev, Russia, after a successful docking of the Soyuz TMA-16 with the International Space Station.

What Is IGMASS?

Perminov clarified the objectives of the IGMASS program, with a strong emphasis on moving towards a global forecasting capability to provide early warning of threats. The full range of disasters monitored as part of IGMASS includes:

- industrial accidents, disasters, and catastrophes
- anomalous solar activity, space debris, asteroid and comet dangers
- earthquakes, tsunamis, volcanic activity
- natural fires
- landslides, mud flows, avalanches
- floods and droughts
- dangerous weather

To monitor these events themselves, and various forms of early signals which may precede some of them (precursors), many different parameters are to be continuously observed and measured (ionospheric disturbances, space debris in low-Earth orbit, vibrations in the Earth's crust, shifts of the Earth's surface, precipitation, water levels, general atmospheric conditions, cloud cover, etc.). For this purpose, numerous land-, air-, and satellite-based systems from various nations will provide the measurements of these parameters, feeding all the information into centralized data centers where it can be integrated, cross-compared, and analyzed. From there, forecasts, warnings, and response assistance can be issued to the relevant governments and institutions.

Perminov went on to say that for monitoring purposes, key projects that either already exist, or are in the process of being developed, could all feed into the IGMASS system of systems. These include international, regional, and other programs consisting of satellite constellations, information-sharing centers, and other observing systems (**Table 1**).

While the full realization of an IGMASS system has yet to be achieved, Russia has pursued the concept since 2007, and in 2012 started designing and even operating limited aspects of a pilot version. The history and status of this program, as well as some initial results of the pilot project, were presented by Prof. Valery Menshikov, the chief designer of IGMASS, and vice chairman of the International Committee for the Realization of the IGMASS Project (**Figure 1**).

Menshikov highlighted September 2010, when the First Deputy Prime Minister of the Russian Federa-

5. Perminov is also the vice president of the International Academy of Astronautics and the deputy designer general/director general of the company Russian Space Systems.

TABLE 1
International, Regional, and Other Programs That Can Be Integrated into IGMASS
Presented by Anatoly Perminov

INTERNATIONAL PROJECTS	• **GEOSS**— A system to link together existing and planned observation systems around the world and support the development of new systems where gaps currently exist. • **Disaster Charter** — Aims at creating a unified system to provide satellite data to those affected by natural or manmade disasters. • **UN-SPIDER** — Operates under the United Nations Office for Outer Space Affairs to use existing satellite systems for disaster management and emergency response.
REGIONAL PROJECTS	• **Sentinel Asia** — A program led by the Asia-Pacific Regional Space Agency Forum to support disaster management in the Asia-Pacific region by using Earth observation satellite data. • **GMES** — Global Monitoring for Environment and Security is a joint program of the European Commission and ESA to pull together information from environmental satellites, air and ground stations to study the Earth's systems. • **SERVIR** — A joint program between NASA, USAID, the World Bank, and the Central American Commission for Environment and Development (CCAD), to provide satellite data to developing nations. • **DMC** — The Disaster Monitoring Constellation is a number of remote sensing satellites operated for the Algerian, Nigerian, Turkish, British and Chinese governments for emergency Earth imaging for disaster relief.
SYSTEMS FOR TELECOMMUNICATIONS, SPACE MONITORING, GLOBAL NAVIGATION, ETC.	• **GALILEO** — Satellite navigation system currently being built by the EU and the ESA. • **GLONASS** — Russia's global positioning system, the only system comparable to the U.S. GPS system. • **Space Monitoring System** — Russia plans on launching four satellites to study the hard-to-reach regions around the North Pole.

FIGURE 1
Stages of the Realization of the IGMASS Project
Presented by Valery Menshikov

1. **Exploratory Research and Development (2007–2011)**
   a. Analysis of engineering and technological capabilities for the creation of elements of the system
   b. Study of the precursors of natural and technogenic disasters, as well as the possibilities of using instruments to record these precursors
   c. Development of the IGMASS concept
   d. Engineering and economic analysis of conditions for the creation, development and functioning of the system
   e. IGMASS system design (development of technical specifications for creation of the system, and its elements)
      • 10 million rubles
2. **Preliminary Design of a Pilot Version of the System in Russia (2012–2014)**
   a. Preliminary design, creation of experimental modules and key elements of the system, development of technical documentation for the manufacture of experimental samples (2012–2013)
   b. Development of models of how the system and its elements' will function (2013–2014)
   c. Creation and testing of the functional subsystems of IGMASS, and adjustment of the technical documentation (2014)
   d. Systematic testing, preparation of technical documentation for mass production (2014)
      • 2,500 million rubles
3. **Creation of a Pilot Version of the System in Russia (2015–2017)**
   a. Fine-tuning the system's ground-based infrastructure (2015)
   b. Deployment of a specialized small spacecraft constellation (2016)
   c. Pre-deployment work on ground infrastructure for the data reception and processing (2015)
   d. Integration of system elements with its international counterparts, integration of monitoring data (2016)
   e. Fine-tuning of ways to achieve the prospective objectives of IGMASS (threats in and from space) through broad international cooperation (2015–2017)
   f. Full-scale testing of functional elements of the system (2016)
   g. Comprehensive testing of the system (2017)
   h. The system goes operational (2017)
      • 7,490 million rubles

Valery Menshikov

tion, the Foreign Ministry, the Russian Academy of Sciences, the Energy Ministry, the Economic Development Ministry, and the Finance Ministry, were all requested to "review the question of implementing the proposal to create an International Aerospace System for Global Monitoring [IGMASS], including resource procure-

ment for the job." All ministries and institutions (with the sole exception of the Finance Ministry) gave a positive evaluation. The Russian Federal Space Agency also sent a "Plan of Top-Priority Measures in 2010-2011 for Implementation of the Proposal to Create IGMASS" to the Russian Academy of Sciences, the Foreign Ministry, the Ministry of Emergencies, the Economic Development Ministry, the Ministry of Regional Development, and the Finance Ministry.

Progress in Seismic Forecasting

Perhaps the clearest examples of the forecasting potential of IGMASS is the ongoing study of the precursor activity that occurs before an earthquake, tsunami, or volcanic eruption. It is hoped that many lives can be saved in the future by monitoring for these precursor signals in order to give early warnings of when and where a seismic event may occur, and how large it may be. This was emphasized by Perminov in his keynote[6] and in other overview reports, and then elaborated in greater detail in four other presentations.

N.N. Novikova

Two of the presentations were by representatives of the Research Center for Earth Monitoring (http://eng.ntsomz.ru/), which directly receives and analyzes data from satellites which continuously monitor the Earth; it is run by the company Russian Space Systems[7] for Roscosmos. Included in its broad array of operations, the Research Center for Earth Monitoring watches for forest fire dangers, potentially dangerous asteroids and comets, and has started a new program to seek out seismic precursors, in an attempt to forecast earthquakes and volcanic activity. Earlier this year, an experimental program was initiated at the center, Project ES SFM (http://www.ntsomz.ru/projects/earthquake), aiming to test real-time seismic forecasting capabilities, and attempting to achieve a targeted objective posed by the Russian Academy of Sciences and the Russian Ministry of Emergencies. Focusing on earthquakes with magnitude 6.0 or greater in the Pacific region of the Kamchatka Peninsula, the Kurile Islands, Sakhalin Island, and Japan, the center made three successful forecasts between May and September 2012.[8]

Although it is a still-improving practice, this initial progress was highlighted by N.N. Novikova of the Research Center for Earth Operative Monitoring, in her presentation about Project ES SFM. Novikova discussed the three successful forecasts issued to the Council of Experts of the Russian Academy of Sciences (**Table 2**), and described the nature of Project ES SFM.

This was followed by a presentation by L.N. Doda, another representative of the Research Center for Earth Operative Monitoring and a participant in Project ES SFM. He included an overview of the methodology used for their earthquake forecasting. What he referred to as the "seismo-tectogenic conception" utilized by the center, is based upon the interaction of a number of factors: gravitational anomalies from shifting mass, local indications from a special analysis of cloud cover, the motion of gases throughout the structure of the Earth, the interaction of the solar/interplanetary magnetic field with the Earth's magnetic field, instabilities in the Earth's rotation, the association of magnetic meridians with tectonic processes, and the effects of solar activity on the Earth ("geoeffective" phenomena) in triggering earthquakes.

A number of satellite- and ground-based systems that monitor these processes are utilized by the center to produce composite maps of key conditions (**Figure 2**). Then specific criteria are used to identify what types of activity constitute a serious warning of a potential seismic event, where it may be, and how large. Doda discussed several examples of the work done at the center, focusing on specific seismic events and the

6. Perminov cited the example of Japan's March 2011, 9.0 Tohoku earthquake and subsequent tsunami which killed over 15,000 people. After the event, analysts went back to examine the recorded data from satellites and other observational systems, finding multiple, independent precursor signals indicating an oncoming major earthquake, days in advance. This case had already been presented to LaRouchePAC-TV on April 11, 2011, by Prof. Sergey Pulinets, http://larouchepac.com/node/17944

7. Russian Space Systems is one of the main supporters of the IGMASS conference, and is crucial to Russian space capabilities. It runs Russia's global positioning system, GLONASS, among many other vital tasks. The company was formed from former Soviet design bureaus which represented a core part of the Soviet space program.

8. For more on this experimental operation on seismic forecasting see http://eng.ntsomz.ru/projects/earthquake/doda_news120712eng

TABLE 2

Forecasts of the Research Center for Earth Monitoring

Presented by N.N. Novikova

Forecasts	Actual Events
May 4, 2012 — Forecasts of a possible powerful earthquake in Japan by May 16. http://www.ntsomz.ru/projects/earthquake/doda_news240412	**May 19-20, 2012** — Three earthquakes of magnitudes 5.9, 5.9, and 6.4 occurred on Honshu island, Japan.
June 15, 2012 — A forecast of a possible strong earthquake between June 20 to 30 was registered with the Expert Council of the Russian Academy of Sciences on June 15, 2012. http://www.ntsomz.ru/projects/earthquake/doda_news240412	**June 17, 2012** — Magnitude 6.4 earthquake on Honshu island, Japan. **June 24, 2012** — Magnitude 6.1 earthquake on Kamchatka .
July 6, 2012 — A forecast was registered with the Council of Experts of the Russian Academy of Sciences warning of "an earthquake with magnitude 6.8 (± 0.2) … on Kamchatka … or deep in the Sea of Okhotsk with a greater magnitude" most likely between July 20 and 30. The forecast also indicates the likelihood of a July earthquake in Japan. http://www.ntsomz.ru/projects/earthquake/eq27072012	**July 20, 2012** — Magnitude 6.1 and 5.8 earthquakes in southern Kamchatka.
July 31, 2012 — A letter extending the July 6 forecast to August 17 was submitted to the Council of Experts. http://www.ntsomz.ru/projects/earthquake/eq27072012 p. 16.	**Aug. 17** — Magnitude 7.7 earthquake in the Sea of Okhotsk (between Kamchatka and the mainland) 625 km deep.
July 18, 2012 — Also at a symposium on natural disasters, Sergey Pulinets warned of, "the approach of an earthquake with magnitude on the order of 6 in the Kamchatka-Kuril region. According to our estimates, it must occur in 5—6 days." http://www.ntsomz.ru/files/art_gisa.docx	

FIGURE 2

Earthquake Symptom Monitoring Systems

Presented by L.N. Doda

1. A system of 9-channel gravimetry stations at the Tula State University (developer: Dr. O. V. Martynov)
2. Strain measurement stations (dev.: I. & V. Stepanov)
3. Subterranean proton measurement stations in Petropavlovsk-Kamchatsky and Chieti (Italy) (dev.: D. A. Kuznetsov, director: V. S. Bobrovsky)
4. Electrotelluric measurement stations in Japan and Greece (Kakioka, Memanbetsu, Kanoya; Athens, Pyrgos)
5. Data from Russian and foreign Earth remote-sensing and cloud cover satellite systems with specialized processing at the Research Center for Earth Operative Monitoring to identify cloud seismo-tectonic indicators and other symptoms in satellite photographs
6. Database of the Paris Observatory's Earth Rotation Service
7. Heliogeophysical parameter databases of various nations

Systems utilized by Project ES SFM of the Research Center for Earth Monitoring in the experimental seismic forecasting program. Translated from Slide 6 of Prof. Doda's presentation, http://www.ntsomz.ru/files/present_doda.pptx

analysis of the conditions leading up to these events, from the standpoint of the seismo-tectogenic conception.

When they have credible indications of an oncoming seismic event, they send a letter to the Council of Experts (**Figure 3**).

In addition to the practical progress in the science of earthquake forecasting, what also stood out to the authors of this article is both the recognition of solar effects on the Earth's seismic processes, and of the *necessity* to incorporate these effects for accurate forecasting. The Sun's activity can fluctuate wildly, at times bombarding the Earth and its magnetic field with intense bursts of material thrown off from the Sun's atmosphere and surface. Geomagnetic storms, extreme weather, and even certain human health conditions are all either known or suspected to be linked to these solar events. The implications of studies conducted at the Research Center for Earth Operative Monitoring over the past year provide strong evidence for linking certain earthquakes to the Sun's activity as well (this is by no means

FIGURE 3

Letter from L.N. Doda to the Russian Expert Council on Earthquake Forecasting and Evaluation of Seismic Dangers

В РОССИЙСКИЙ ЭКСПЕРТНЫЙ СОВЕТ ПО ПРОГНОЗУ ЗЕМЛЕТРЯСЕНИЙ И ОЦЕНКЕ СЕЙСМИЧЕСКОЙ ОПАСНОСТИ

От члена РЭС Доды Леонида Николаевича
Тел.: [redacted], e-mail: [redacted]

Уважаемый Александр Иванович!

Прошу зарегистрировать и дать экспертную оценку следующему комплексному прогнозу: до 4 июля 2012 г. в одной из потенциальных зон, представленных на прилагаемой сейсмопрогнозной карте в виде желтых овалов, возможно землетрясение с магнитудой М6.5-7.0 (±0,2). Вероятные даты указаны в условных обозначениях сейсмомеридианов в легенде карты, пересекающих указанные зоны. Высока вероятность подобного ЗМТ в Японской зоне и на Камчатке с магнитудой М6.0+.

Прогнозная карта на июнь 2012 г. и композит с облачными сейсмоиндикаторами отправлены Вам по электронной почте 15 июня.

Л. Дода
15.06.2012

Реализация: 1.17.06.2012-20:32-(38,9;141,9)-М6,4-Н32-вост. Хонсю

2.24.06.2012-03:15-(57,6;163,0)-М6,1-Н17-с/в Камчатки

http://www.ntsomz.ru

An earthquake forecast from L.N. Doda of the Research Center for Earth Monitoring, June 15, 2012. Translation of the letter: "Kindly record the following integrated forecast and provide an expert evaluation of it: An earthquake with magnitude M6.57.0 (±0.2) is possible before July 4, 2012 in one of the potential zones shown on the attached seismic forecast map in the form of yellow ovals. The likely dates have been indicated in the map legend by notations corresponding to where the seismic meridians intersect the indicated zones. There is a high probability of such an earthquake with magnitude M6.0+ in the Japanese zone, and on Kamchatka.
"The forecast map for June, 2012, and the composite with cloud seismic indicators were e-mailed to you on June 15."
Realization: 1. June 17, 2012-20:32-(38.9; 141.9)-M6.4-H32-Eastern Honshu
2. June 24, 2012-03:15-(57.6; 163.0)-M6.1-H17-by/on Kamchatka

the first time this hypothesis has been introduced or tested).[9]

In the seismo-tectogenic conception, the solar-earthquake relationship is mediated through the Earth's magnetic field. On the one side, recent studies at the center claim to show strong evidence that seismic activity can be triggered by geomagnetic activity[10] (which they take into account in their forecasting); while on the other side, it has been long known that solar activity can cause large-scale fluctuations in the geomagnetic field (geomagnetic storms). As discussed above, this is not the only factor to consider, but the practical necessity to include it is highly significant for understanding the integrated connection among the Earth, the Solar System, and our galaxy.

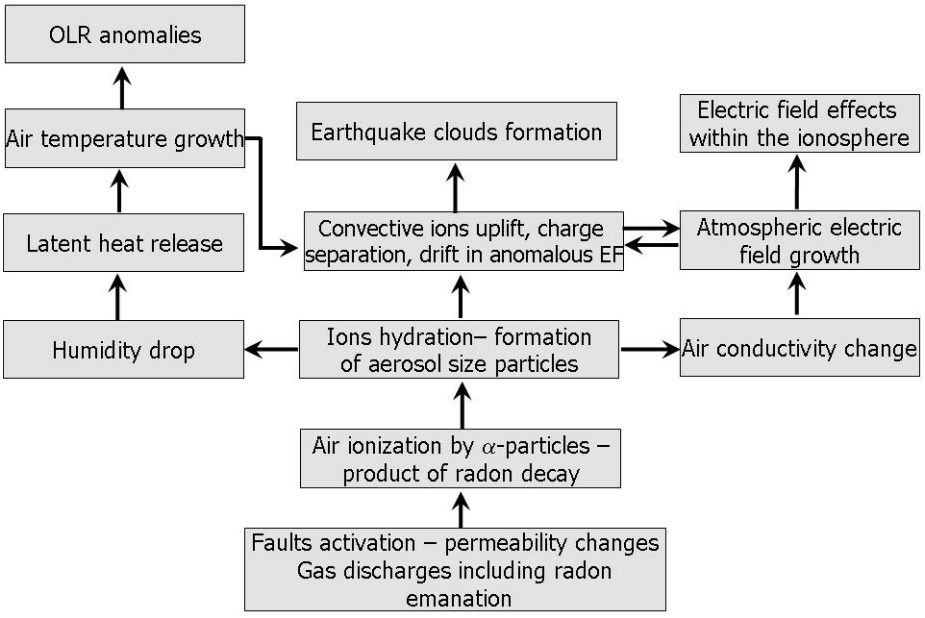
Sergey Pulinets

Prof. Sergey Pulinets of Russian Space Systems then presented his work on the theoretical structure underlying the processes that generate earthquake precursors. Identifying this as the "Lithosphere-Atmosphere-Iono-

9. For example, see, "Possible Correlation between Solar Activity and Global Seismicity," by Jusoh Mohamad Huzaimy and Kiyohumi Yumoto, Proceedings of the 2011 IEEE International Conference on Space Science and Communication (IconSpace) July 12-13, 2011, Penang, Malaysia.

10. See http://eng.ntsomz.ru/projects/earthquake/dodanews22062011 and http://eng.ntsomz.ru/projects/earthquake/dodanews07072011

FIGURE 4
Lithosphere-Atmosphere-Ionosphere Coupling Model



Sergey Pulinets

sphere Coupling Model" (LAIC, **Figure 4**), Pulinets detailed the relationships and mechanisms behind the various phenomena that can precede and even give forewarning of an upcoming seismic event (precursors). These include infrared emissions (outgoing longwave radiation, OLR), earthquake clouds, and variations in the ionosphere, all of which, Pulinets argues, can result from the emissions of radioactive radon gas from an active fault preparing to give way. The ionizing effects of this lithospheric radon emission on the atmosphere, and the subsequent interaction of the atmosphere with the ionosphere, generates this detectable array of precursor signals, which can be used to forecast a seismic event.

These three presentations, along with two earlier ones on satellite- and ground-based methods for monitoring the conditions of the ionosphere linked with seismic activity, rounded off the discussion of seismic forecasting.

The objective discussed by Perminov and others, is to develop this capability and incorporate it as a key component of IGMASS, creating a new line of defense from earthquakes, volcanic eruptions, and tsunamis.

Planetary Defense

Another major component of planetary defense discussed at the conference was the early detection and defense against potentially hazardous asteroids and comets. Impacts have occurred throughout the history of the Earth, and the inevitability of future asteroid or comet impacts with the Earth has become an area of growing concern within scientific and defense circles internationally. An impact will happen at some point in the future (we just don't yet know when), and we do have the technology to defend the entire Earth from this threat—but only if we take the appropriate measures to, first, discover and track all the objects that could pose a threat, and, second, have a defense plan ready in the event we need to deflect one of these objects. Russia's own experience of the 1908 Tunguska event has instilled a keen interest in this subject within the country's scientific community (**Figure 5**).

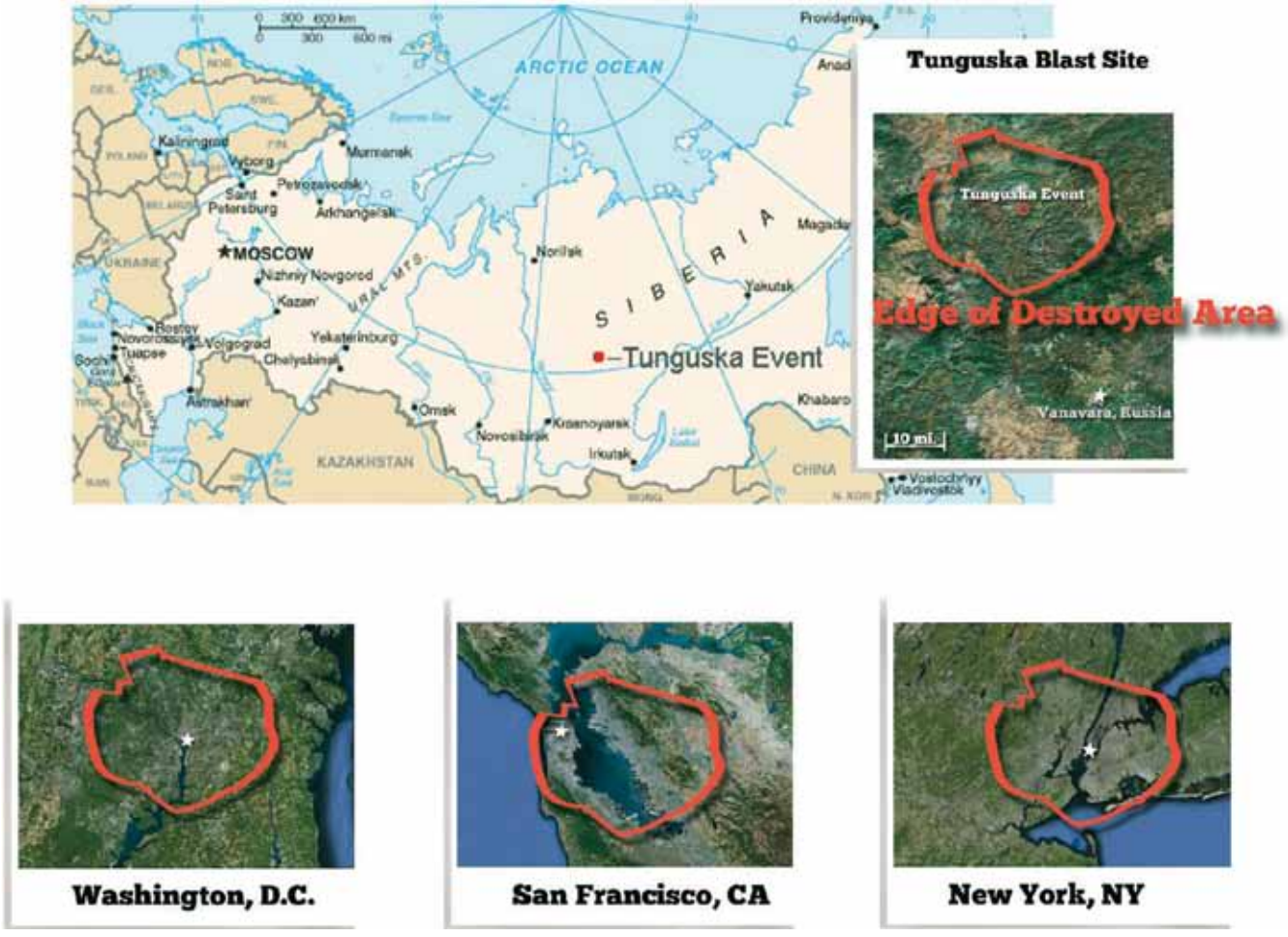
This subject was taken up on the second day of the conference by Sabit S. Saitgarayev, a representative of one of Russia's key missile and rocket centers, the Academician V.P. Makeyev State Rocket Center.

Saitgarayev's presentation, "Proximity Echelon for Protection of the Earth Against Hazardous Space Objects as the First Stage of the System Development," opened with a summary of key background information on the range of asteroid and comet sizes, and how frequent and energetic impacts are for differently sized objects (impacts from larger objects are less frequent, but more damaging, while smaller objects hit the Earth more often, but are also less energetic). He then discussed early detection, saying that we must focus on the entire region between the orbit of Venus and the orbit of Mars, in attempting to identify the objects long before they may hit the Earth. Saitgarayev concluded with a review of various methods that can be used to ensure that an incoming object does not impact the Earth, noting that his Center could produce the rocket system needed for such a mission.

While Saitgarayev's discussion remained within the realm of chemical rockets, another presenter pro-

FIGURE 5

The Tunguska Blast (1908) and Modern Comparisons



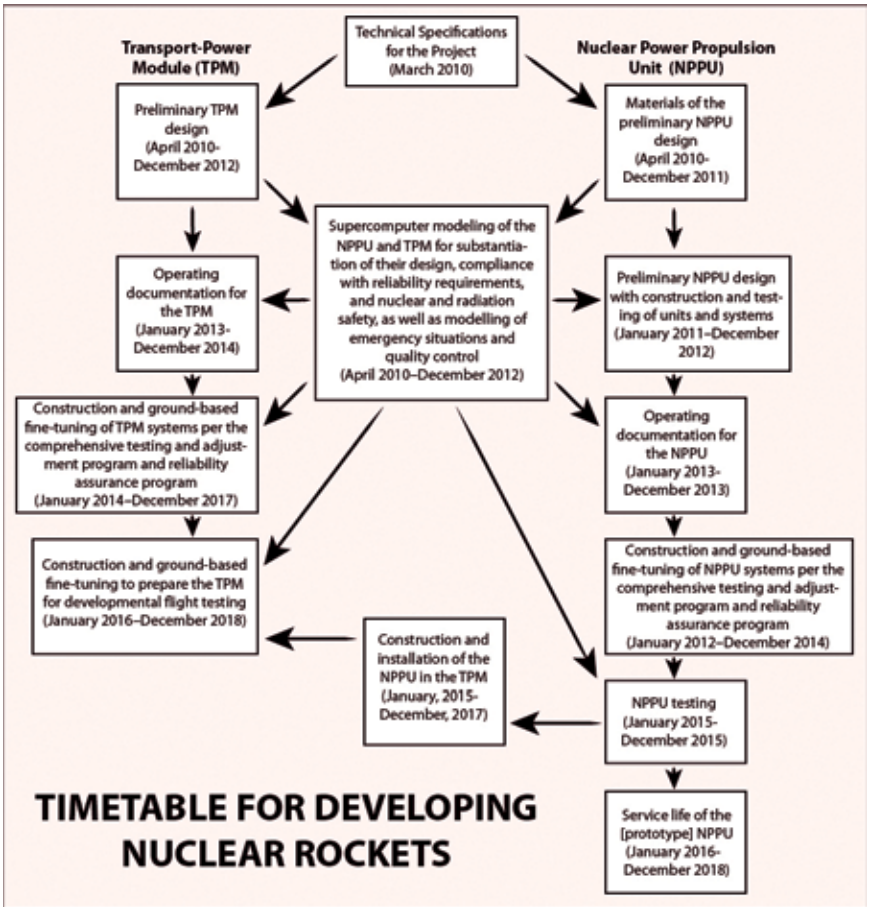
The Tunguska blast was an atmospheric explosion thought to be from a small asteroid or comet exploding as it entered the Earth's atmosphere at extremely high speed. Fortunately, this occurred over an uninhabited region of Siberia, as it leveled 830 square miles of trees. Any major metropolitan region today would be destroyed by an impact of this size.

vided a more forward-reaching option: the development of nuclear rockets. Anatoly S. Koroteyev of the Keldysh Research Center (a major unit of Roscosmos)[11] focused on "problems of space propulsion," emphasizing the need to develop nuclear systems in space. Summarizing the history of nuclear rockets, Koroteyev included a note about their possible applications for defense against asteroids and comets. The power density available with nuclear power allows for propulsion systems that can provide significantly more in-flight acceleration/deceleration (whereas chemical propulsion systems are limited to ballistic trajectories), improving the capability to alter the orbits of dangerous objects which may be on a collision course with Earth. Koroteyev noted that even the basic electricity requirements of satellite systems have been increasing logarithmically throughout the space age, and the limit of what chemical

Anatoly Koroteyev

11. The Keldysh Research Center is a state-run facility under the direction of Roscosmos. It is Russia's leading organization in the field of rocket engine manufacturing and space power: developing, manufacturing, and testing rocket engines, space power systems, high-energy beam generators, and particle accelerators.

FIGURE 6



Anatoliy S. Koroteyev

and solar power can provide is being reached, further making the case for nuclear. He ended with a brief overview the Russian government's perspective to develop new nuclear power systems in space, in which they plan on completing a new nuclear rocket by 2017 (**Figure 6**).

With these presentations focusing on the power and propulsion side, other presentations looked at examining man's observational capability in space. Specific proposals to expand our observational capability came from M.S. Chubey of the Pulkovo Observatory, near St. Petersburg. Titled "Orbital Stereoscopic Observatory," Chubey's proposal is to place two identical optical telescopes in orbit around the Sun, one that is always trailing behind the Earth, and another that is always ahead (see **Figure** 7; these are referred to as the Lagrange points 4 and 5, or "L4" and "L5").

M.L. Chubey

The significant distance between L4 and L5 would provide a *stereoscopic* view of our Solar System and beyond, increasing our ability to judge distances (among other benefits), and improving our capability to see asteroids and comets, calculate their distance, and determine whether they are going to hit the Earth. The distances to nearby stars could also be directly calculated by measuring the parallax between the two different observatories.

Toward a Global Revolution

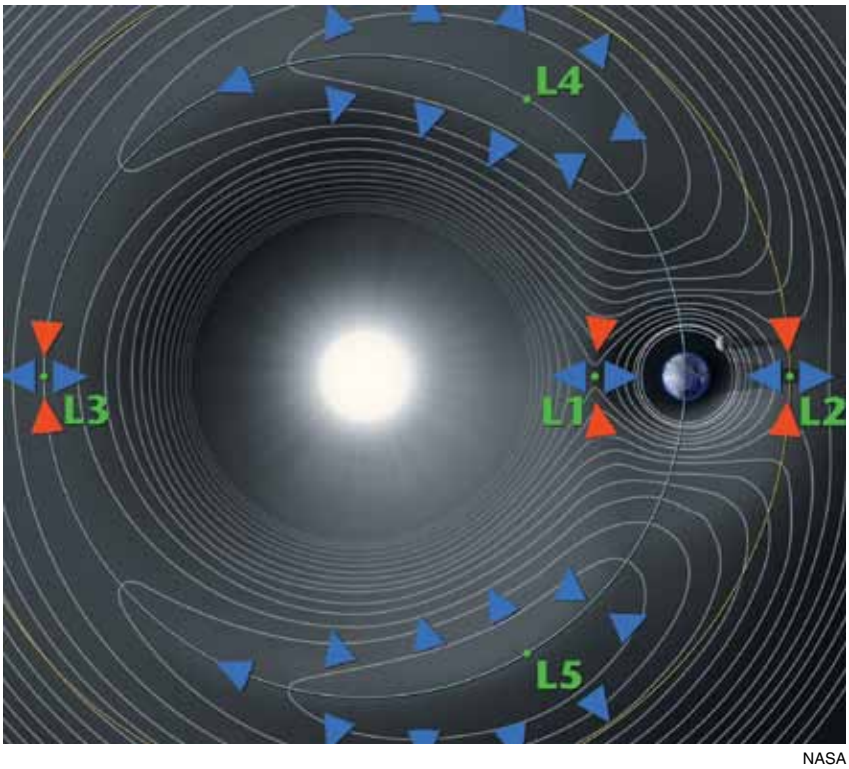
The IGMASS conference demonstrated that there is progress being made in programs that can transform mankind's ability to defend itself from a wide array of threats. While some of this work is truly revolutionary, there are certain global realities that must be introduced here.

What became clear throughout the conference is not only the importance of a framework like IGMASS to forecast and respond to potential catastrophes on an international basis, but also the need for a larger political shift in order to achieve its full realization. Two points stood out:

First, underlying the three-day event was the reality of the collapsing global economic system, and the lack of financial, physical, and human resources required to actually achieve these absolutely necessary programs.

Second, the success of a system like IGMASS will only be fully realized through the integration of the scientific capabilities of all leading nations, something that will require the involvement of the United States. The capabilities of NASA, NOAA, and the U.S. military provide an in-depth capacity that could be integrated

FIGURE 7
The Earth-Sun 'Lagrange Points'



NASA

The five Earth-Sun Lagrange points (bodies not to scale) are locations where the gravitational effects of the Earth and Sun reach a type of equilibrium. L4 and L5 are known as stable points, within which small bodies, such as small asteroids or man-made satellites, can maintain an orbit.

with Russia, China, and other nations to provide all mankind with the greatest possible defense from the threats discussed here. However, the current orientation of the United States toward Russia and China is a dangerously adversarial one.

For both these reasons, the political-strategic framework initially proposed by LaRouche as the SDI of the 1980s—and the recent re-offer by Russia in the form of the SDE—becomes crucial. Without the global economic reforms being proposed by LaRouche,[12] and the strategic shift to top-down, science-driven cooperation among the United States, Russia, and China, the aims underlying the intention of IGMASS could never be fully realized.

To properly understand this challenge, we are forced to take a larger historical view of mankind's existence on Earth, and within the Solar System. What was referred to in the opening as a necessary *coming-of-age of mankind*, is the fundamental imperative underlying the scientific/technological challenges, but also the political, social, and cultural challenges now faced.

Can nations with different histories, different cultures, and different political structures unite in advanced scientific collaboration to overcome the challenges that face all mankind? Can leading nations overthrow the still-existing reigns of a millennia-old oligarchical system, currently centered in the global British Empire?

There is a basis for conquering these challenges, but it is only found in a scientific conception of the power that mankind actually expresses in the universe, as a uniquely creative species, and the future that mankind must act to create to ensure progress, defense, and development.

That is true planetary defense.

The issue becomes nothing less than man's self-realization of his role in the universe. As LaRouche continues to develop in his writings, the fundamental block that still holds people back from achieving this, is their false belief in their own sense perceptions. Human biology does not provide an "honest" representation of mankind's interaction with the universe. Sense perceptions are merely shadows. It is only through the higher capability of the human mind—something strictly not biological—that man can fulfill his active role of always continuing to create completely new and higher forms of action within the universe.

This is illustrated clearly by the concept of the IGMASS system, with the integration and expansion of multiple arrays of artificial sensory systems. Created by the unique powers of the human mind, these systems become integrated into the noetically extended artificial sensorium of man, increasing the power of the human species to understand and change the universe—an imperative for mankind at the present time of crisis.

12. See the LaRouchePAC report, The Full Recovery Program for the United States, http://larouchepac.com/fullrecoveryplatform