NORTH ATLANTIC TREATY ORGANIZATION

SCIENCE AND TECHNOLOGY ORGANIZATION

LECTURE SERIES
AVT-285

on "Rare Earths: Securing Supply Chains, Materials, and Technologies"

sur "Terres rares: sécuriser les chaînes d'approvisionnement, les matières premières et les technologies"

organized by the

NATO Science and Technology Organization

Applied Vehicle Technology Panel

to be held at

Edificio Celestino Mutis, University of Seville

Seville, Spain

19-20 January 2017

This Lecture Series is open to citizens from NATO, Partnership-for-Peace (PfP) Nations and Australia.

Latest Enrolment Date

NATO Nations	**12 January 2017**
Non NATO Nations	**5 January 2017**

Enrol on-line at
https://www.cso.nato.int/detail.asp?id=9233

All presentations and discussions will be held in English.

Background

The mission of the NATO Science and Technology Organization (STO) is to help position Science and Technology (S&T) investments as strategic enablers for knowledge and technology advantage. Against this backdrop Allied and partner Nations conduct and promote S&T activities that augment and leverage capabilities, contribute to enable and influence capability development and threat mitigation, and support decision making.

The STO is governed by the Science and Technology Board (STB) The STO comprises a large network of subject matter experts from government, institutes, academia and industry. They work together in six Panels, one Group and one Centre for Maritime Research and Experimentation (CMRE) on topics of interest to their Nations and NATO. The Applied Vehicle Technology (AVT) Panel is one of the Panels under the STB.

The AVT Panel strives to improve the performance, affordability, and safety of vehicles through advancement of appropriate technologies. The Panel addresses vehicle platforms, propulsion and power systems operating in all environments (land, sea, air, and space), for both new and legacy systems.

To accomplish this mission, the members of the AVT community exploit their joint expertise in the fields of:

- Mechanical systems, structures and materials;
- Propulsion and power systems; and
- Performance, stability and control, fluid physics.

Theme

Our modern society relies on the use of rare-earth elements – the "vitamins' of the technological age. Rare earths are enablers – vital for the operation of numerous defense and commercial end-use applications. This lecture series will inform and educate the audience on the entire rare-earth supply chain, including issues relating to supply and demand, production, end-use applications, and efforts to reduce dependency on these elements.

Topics to be covered:

- Rare-earth supply and demand dynamics;
- End-use applications for rare earths;
- Rare-earth geology and mineral-resource development;
- Mining, minerals processing and extractive metallurgy;
- Separation, metal and alloy production;
- Efforts to "reduce, re-use and recycle" rare earths;
- Rare-earth materials engineering research and development.

Thème

La société moderne repose sur l'utilisation des terres rares, les « vitamines » de l'ère technologique. Les terres rares sont des éléments essentiels au fonctionnement de nombreuses applications finales grand public et de défense. Cette série de conférences informera et sensibilisera les participants à toute la chaîne d'approvisionnement des terres rares, notamment aux problèmes d'offre et de demande, de production et d'emploi ainsi qu'aux efforts déployés afin de réduire la dépendance à ces éléments.

Sujets traités:

- Dynamique de l'offre et de la demande des terres rares ;
- Emplois des terres rares;
- Géologie des terres rares et développement des ressources minérales;
- Extraction, transformation des minéraux et métallurgie extractive ;
- Séparation, production de métal et d'alliage;
- Efforts de « réduction, réutilisation et recyclage » des terres rares;
- Ingénierie, recherche et développement des terres rares.

Lecture Series Director

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LECTURE SERIES PROGRAMME

DAY ONE: THURSDAY, 19 JANUARY 2017

9:00	Registration
9:30	Opening Ceremony & STO Overview
9:45	Session 1: Lecture Series Introduction and Overview (Dr. Hatch)
10:30	Session 2: Current Technologies Enabled by Rare-Earth Elements (Prof. Franco)
11:45	Break
12:15	Session 3: Rare-Earth Supply-Chain Challenges (Prof. Kingsnorth)
13:30	Lunch Break
15:00	Session 4: Rare-Earth Geology, Mineralogy and Resource Development (Prof. Eggert)
16:15	Break
16:30	Session 5: Rare-Earth Mining, Mineral Processing and Extractive Metallurgy (Prof. Anderson)
17:45	End of Day 1

DAY TWO: FRIDAY, 20 JANUARY 2017

9:00	Session 6: Rare-Earth Separation, Purification, Metal and Alloy Making (Prof. Anderson)
10:15	Break
10:45	Session 7: Rare-Earth-Based Components and Assemblies (Dr. Johnson)
12:00	Session 8: Rare-Earth Re-Use and Recycling (Dr. Rollat)
13:15	Lunch Break
15:00	Session 9: Engineering Future Applications for Rare-Earth Criticality (Prof. Franco)
16:15	Break
16:30	Panel Review and Discussion
17:30	Closure

APPLICATION TO ENROL
LECTURE SERIES AVT-285

Seville, Spain during 19-20 January 2017

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Enrolment must be made via internet only at
https://www.cso.nato.int/detail.asp?id=9233
Note: if you enrolled for other RTO-STO activities in the past, please use the same e-mail address as previously. If your e-mail address has changed, please inform the STO-CSO contact before enrolling.

Once your enrolment has been validated, you will receive a General Information Package with the latest information on travel, accommodation and local arrangements. Please note that participants are to make their own travel arrangements and hotel bookings.

If you are unable to enrol via the internet, please contact the CSO enrolment coordinator:

lectureseries@cso.nato.int

Please respect the following dates for enrolment:

Latest Enrolment Dates

NATO Nations	**12 January 2017**
Non NATO Nations	**5 January 2017**

Contact/Enrolment Coordinator

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