



Geo-information for
Disaster Management



The First International Symposium on Geo-information for Disaster Management

March 21 - 23, 2005, Delft, the Netherlands.

EUROPEAN BUSINESS INNOVATION
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Ing.pilot SIMION DASCALU
EBIC Bucuresti, ROMANIA - 2005

PROJECT OCTAGON

Special UAVs – Autonomous Airborne Platforms

The Brief Presentation of the Scientific and Technical Objectives

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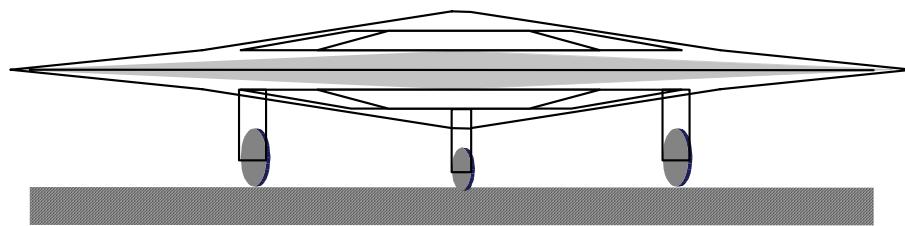
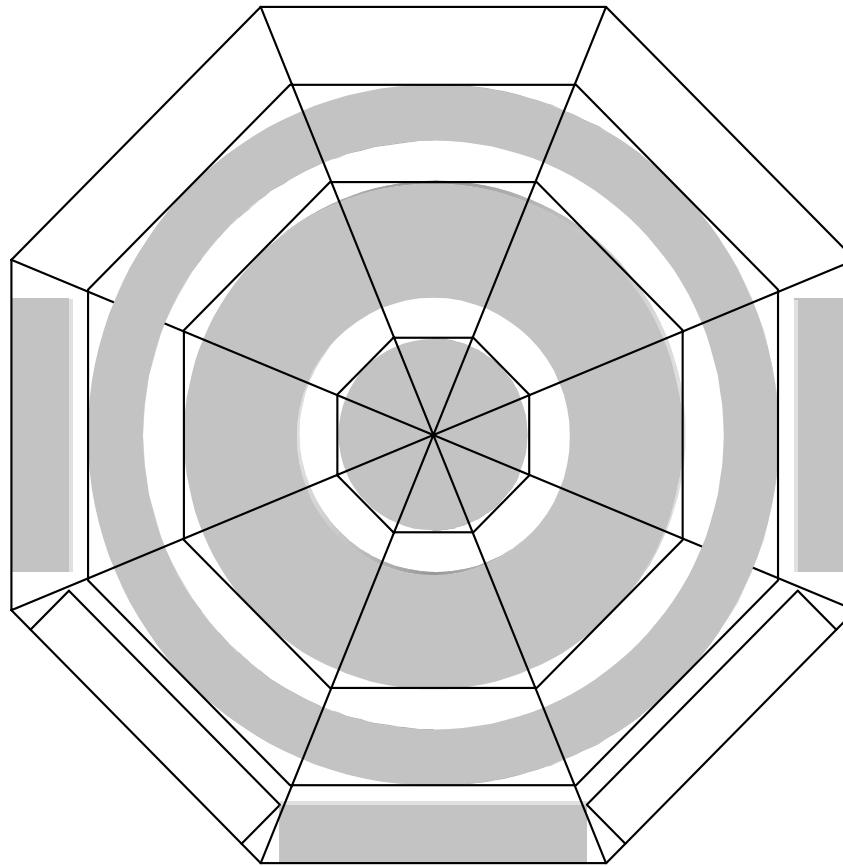
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Special UAVs – Autonomous Airborne Platforms

The main dimensions and basic operational characteristics of this Autonomous UAV are the followings:

- the wing span over all is 5.00 meters;
- the length over all is 5.00 meters;
- the height over all on wheels is about 2.00 meters;
- maximum take-off weight is estimated at 1,200.00 kg;
- payload estimation is 250 kg minimum in addition to the fuel maximum weight of 350 kg;
- cruise speed of around 550 km/h (270 knots) and 2.5 hours a minimum operation mission;
- the operational altitude is unlimited due to the new electrical propulsion system.



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Special UAVs – Autonomous Airborne Platforms

Concept design, principles, idea and technology used in this project:



< Helicoper

Bi-plane aircraft >



Autonomous UAV>



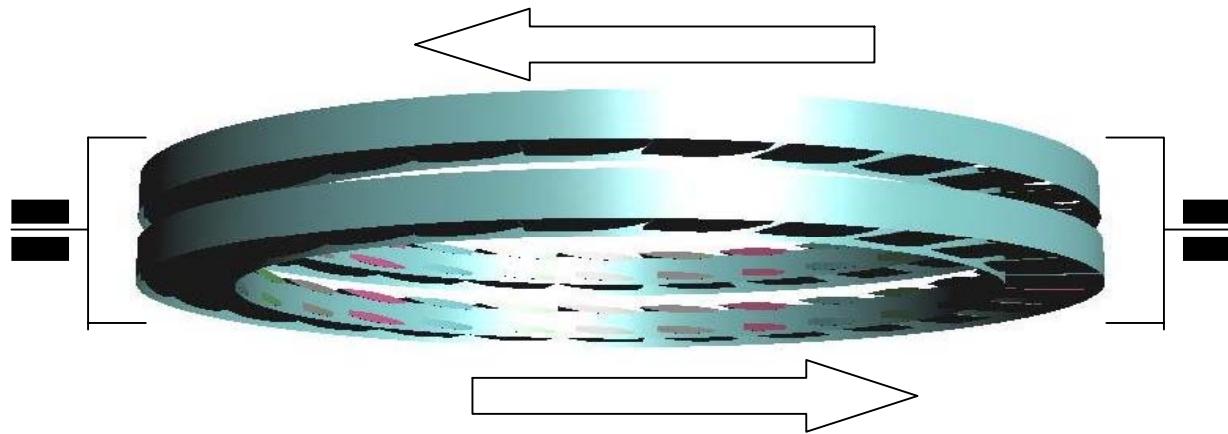
Turbo-Fan Engines >



The present project is focused to offer and to provide for disaster management, search and rescue, aid air support, aerial monitoring and surveillance, and special for the air transport industry an unique flying platform with all the equipment required for the detection and to monitor very dangerous atmospheric phenomena impending threats for air traffic in general, for all civil and military aircraft.

Special UAVs – Autonomous Airborne Platforms

Dual Fans - Power Ring Propulsion System

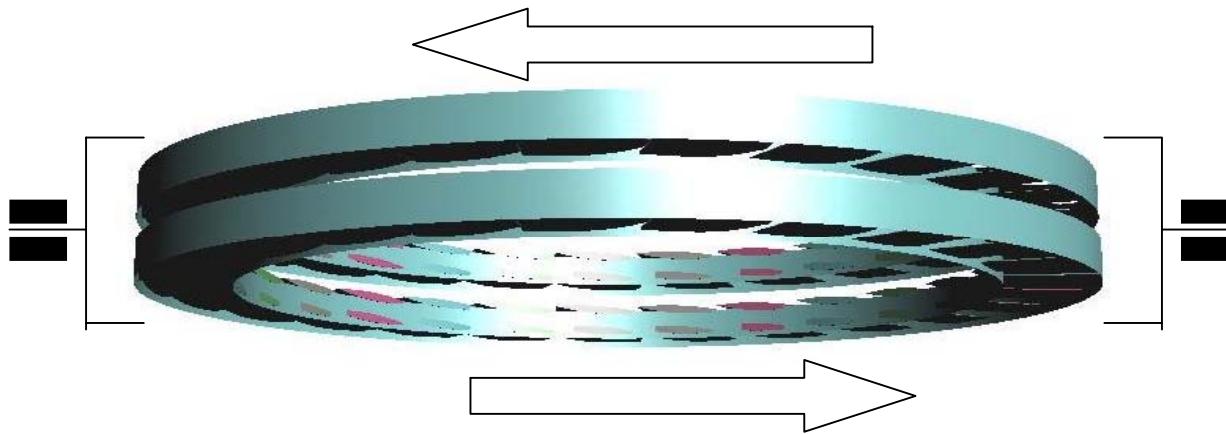


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The UAV's propulsion system is the Power Ring which can be fix in the simplest construction or inside of a cardan joint to provide the thrust vectoring in an advanced construction mode. In all design cases the Power Ring is a double fan system consist of two great fans rotating in the opposite directions to reduce the gyroscopic moments and forces, and each of these fans is also a complex system of parallel short wings between two of each fan's vertical rings. Each of the two fans has a dual blades classic system due to the fact that each fan has a large diameter and is more suitable for a short parallel wings configuration (see biplanes design as some of First World War airplanes) that was design by our purpose to have similar characteristics with an helicopter rotor inside of the UAV's structure for few main reasons: to provide more lift at the same rotor area and power, to reduce external noise, to increase the speed of the rotor up to the supersonic limits, to improve operational safety relative to the hazard impact with birds.

Special UAVs – Autonomous Airborne Platforms

Dual Fans - Power Ring Propulsion System



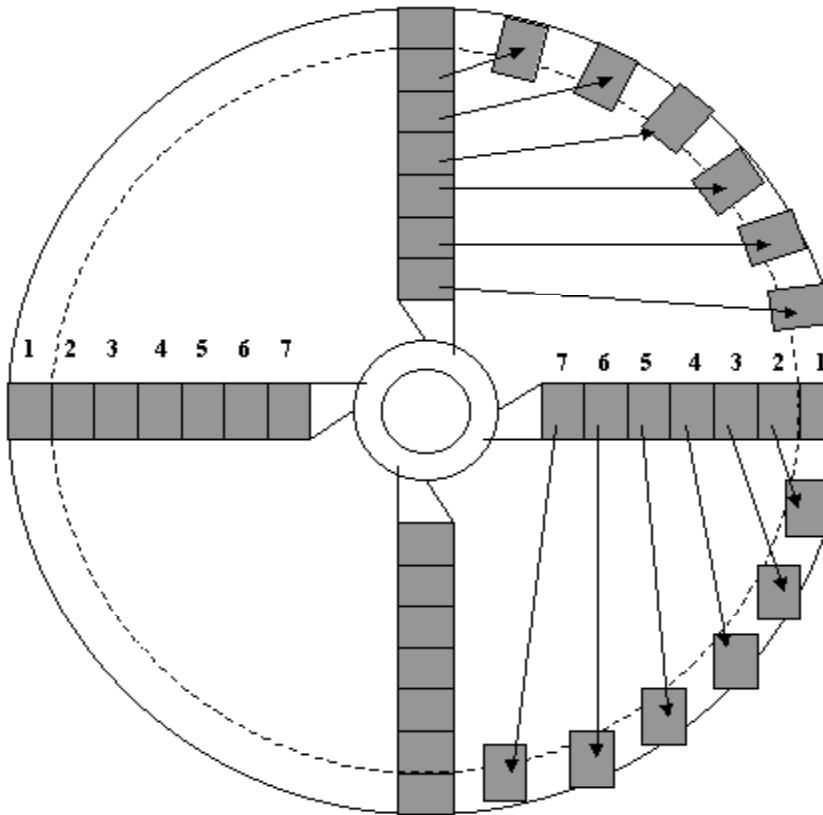
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Each such small wing within the fan-ring is a system of two wings one above the other similar as the classic biplane aircraft of the First World War, that is more efficient at low speeds with 30 up to 50% as any single wing system. The system of dual wings is moving through the air between two ring-walls and therefore, the induce drag is also zero, but the angle of incidence is able to be adjusted in a more complex construction or can be maintained at optimal levels and then just the speed of the fan-ring will increase the total lift force as may be required in operation.

The high efficiency of the Power Ring Propulsion System is achieved by using a combination of three main technical solutions such as the Ring Propulsion, the biplane wing effect and the dual fan with opposite rotation mainly to reduce the well known gyroscopic effect of a single rotor/fan.

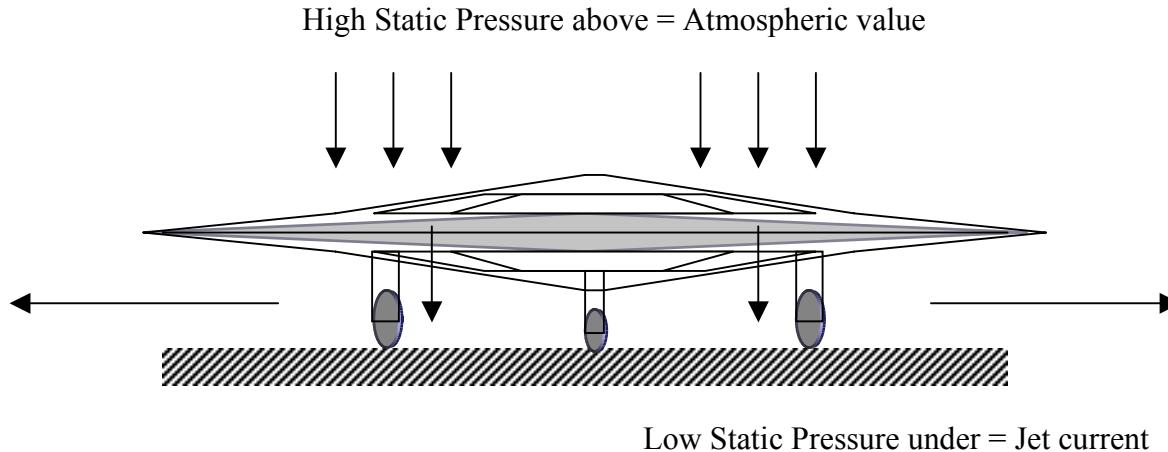
Special UAVs – Autonomous Airborne Platforms

The classic helicopter rotor blades are divided into wing parts and spread around the circle.



The Ring Propulsion is a result of spreading around the circle the classic helicopter rotor blades equally divided into small wings and each part is appropriately adjusted between two ring-walls, and the result is like a fan-ring that is more efficient with 15% relative to the equivalent rotor.

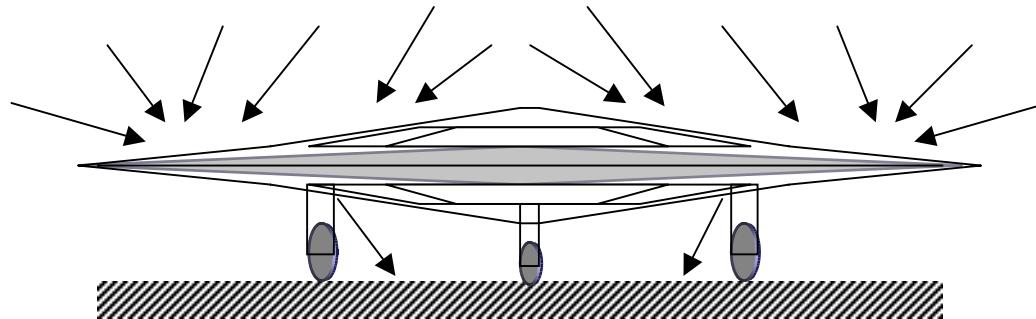
Special UAVs – Autonomous Airborne Platforms



The main UAV problem is the above aerodynamic paradox specific for a such design that was not solved yet. The paradox is that: as fast the jet current is required to push the UAV aircraft upwards the static pressure under is lower then the static atmospheric pressure above the aircraft which in pushing downwards, increasing the jet speed under will generate even more reduction of the static pressure under the aircraft relative to the fixed atmospheric static pressure value above, and due to this important reason the UAV aircraft will not be able to take-off.

Special UAVs – Autonomous Airborne Platforms

Low Static Pressure above due to Vacuum effect



The aerodynamic paradox is solved using the vacuum effect over the body-wing area.

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The air above the UAV aircraft is diverted to enter in the propulsion fan system using two rings of intake opening systems leading the air direct to the Power Ring Propulsion System and the eject thrust vectoring system is creating the jet current deflected with up to 300° from the vertical direction during the take-off procedure, that is able to increase the overall pressure under aircraft as well as the ground effect. Therefore, the total efficiency of the Power Ring Propulsion System is well managed and included during overall design procedures for the Special Operations UAV.

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The Special Operations UAV named as the OCTAGON Project is an autonomous flying platform special designated to monitor Low Altitude Electromagnetic Turbulence in the atmosphere of Earth. This is a new technical solution and development based on the actual level of the aerospace technology that includes inter alias an electric propulsion system assisted named as the Power Ring System which is using the aerodynamic elements of a new Romanian Patent on the airfoils design (the electrical propulsion system solution is in the due procedure to be protected by a separate patent license, and that will be our future AERO EBIC project of the next FP6 call, the Priority 4 - Aeronautics and Space).

PROJECT OCTAGON

Special UAVs – Autonomous Airborne Platforms

The basic designated flight missions and special operations are :

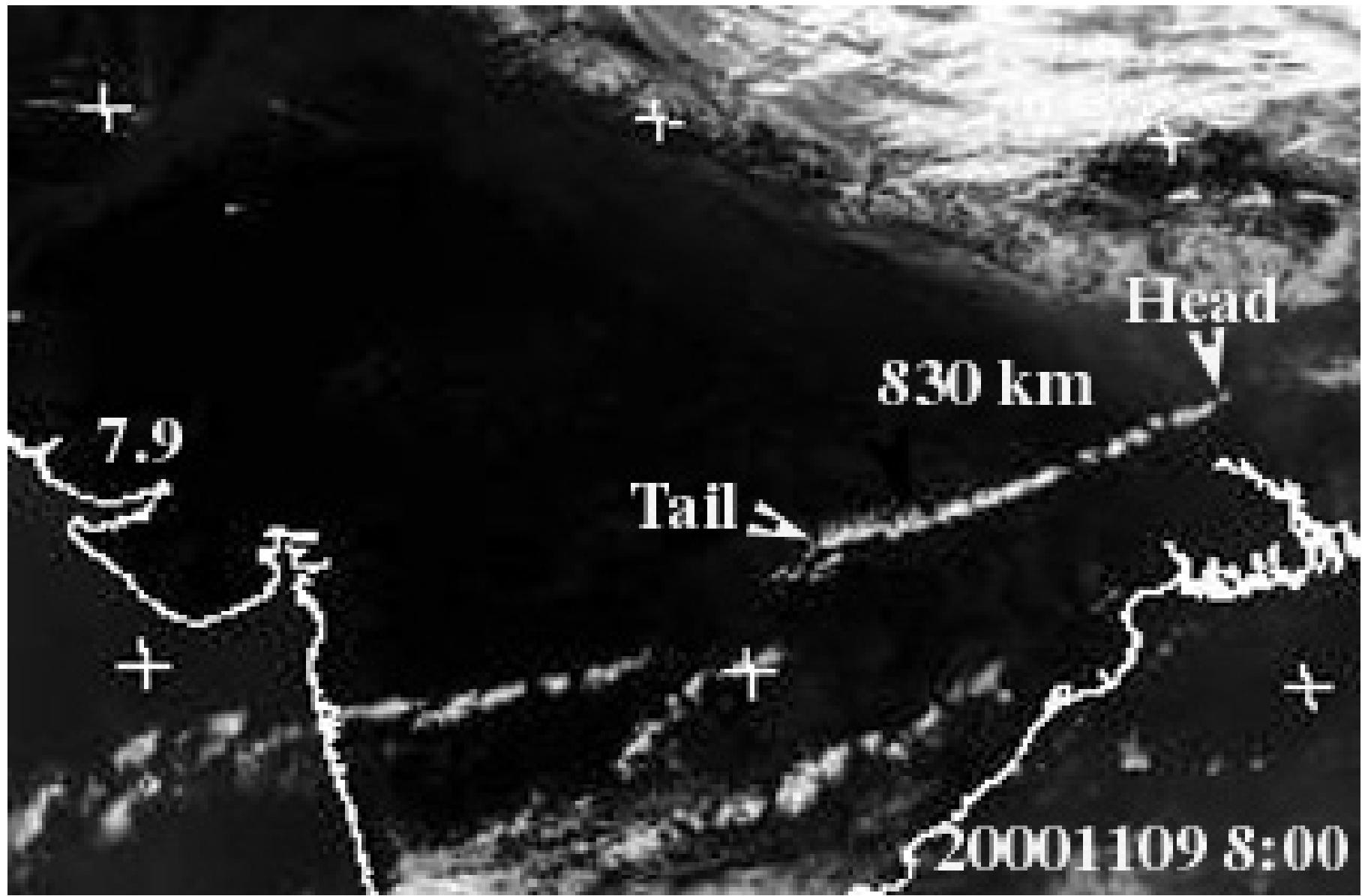
- low cost geo-spatial information, spotting, land and sea remote sensing, photogrammetry, GIS and mapping, extended hovering operations;
- aerial images and real-time data acquisition over remote areas;
- geo-information and disasters monitoring available every where;
- research and monitoring the low altitude atmosphere;
- detection and monitoring low altitude electromagnetic turbulence dangerous atmospheric phenomena and hazard weather behavior;
- aerial investigation of volcanic activities, forest fires, floods, etc;
- aerial investigation/monitoring of any high contaminated areas;
- Special Defense Operations over off-shore areas, cross borders movements check/detection, environment and pollution controls, up to the use in Space Explorations, such as the planet Mars, etc.
- the flight altitude is unlimited due to electrical propulsion system.

Spiral configuration is an interference result of waves



At low altitude in the Earth's atmosphere the Low Altitude Electromagnetic Turbulence (EMT) is the result of the interference between the Earth's local area electromagnetic field configuration and the Schumann Resonance.

Spiral Cloud configuration



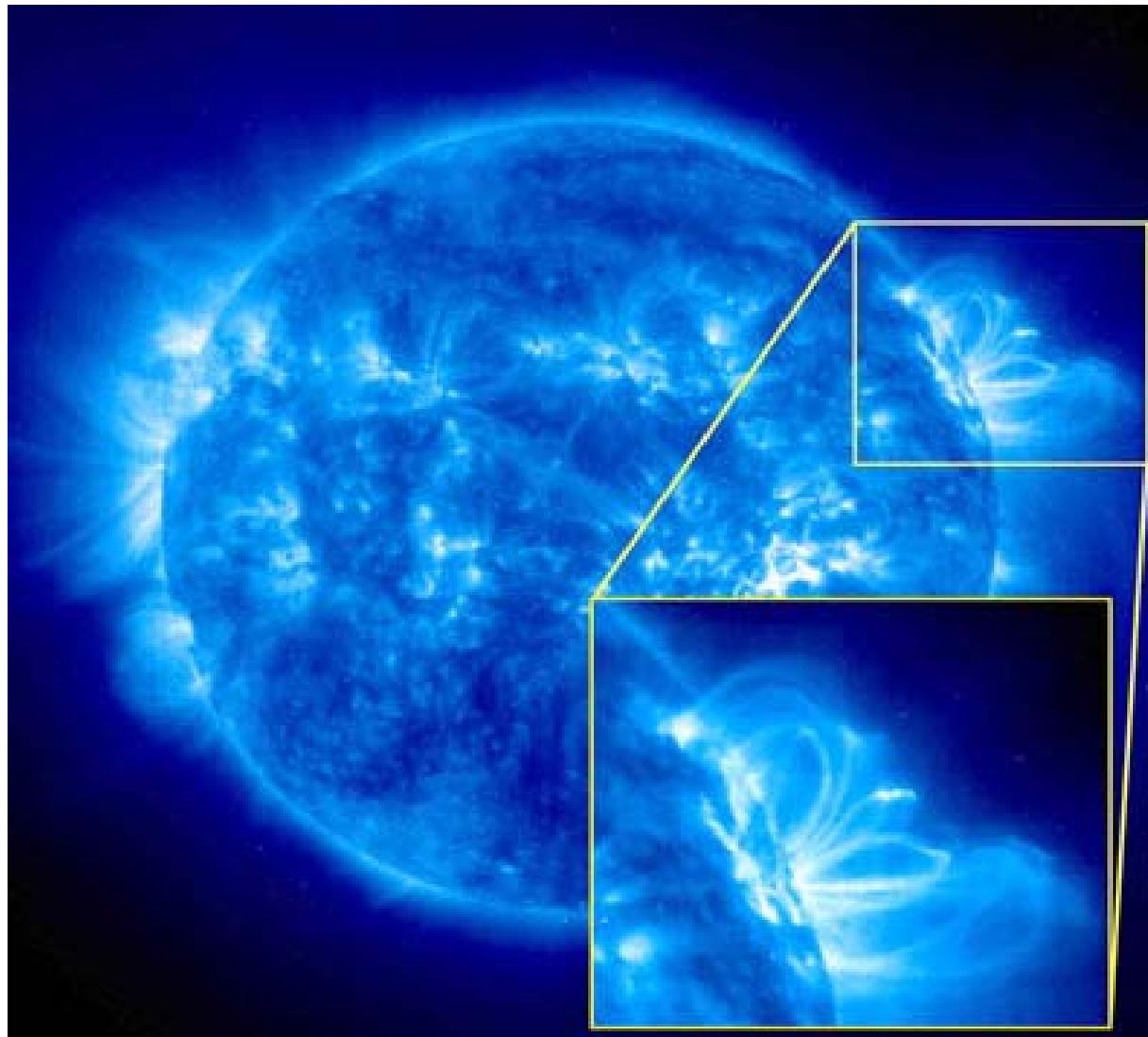
North-East India the spiral cloud recorded shortly before an Earthquake.

Aircraft wake wave turbulence during take-off procedure



The aircraft wake wave turbulence is well known and can be seen more often during take-off or landing procedures.

Sun flares



These are flares and corona explosions blowing supercharged particles out in space and creating the solar wind, and all of these have a very special forms, charge particles are following the Sun's electromagnetic field configuration.

Cloud-to-ground Lightning



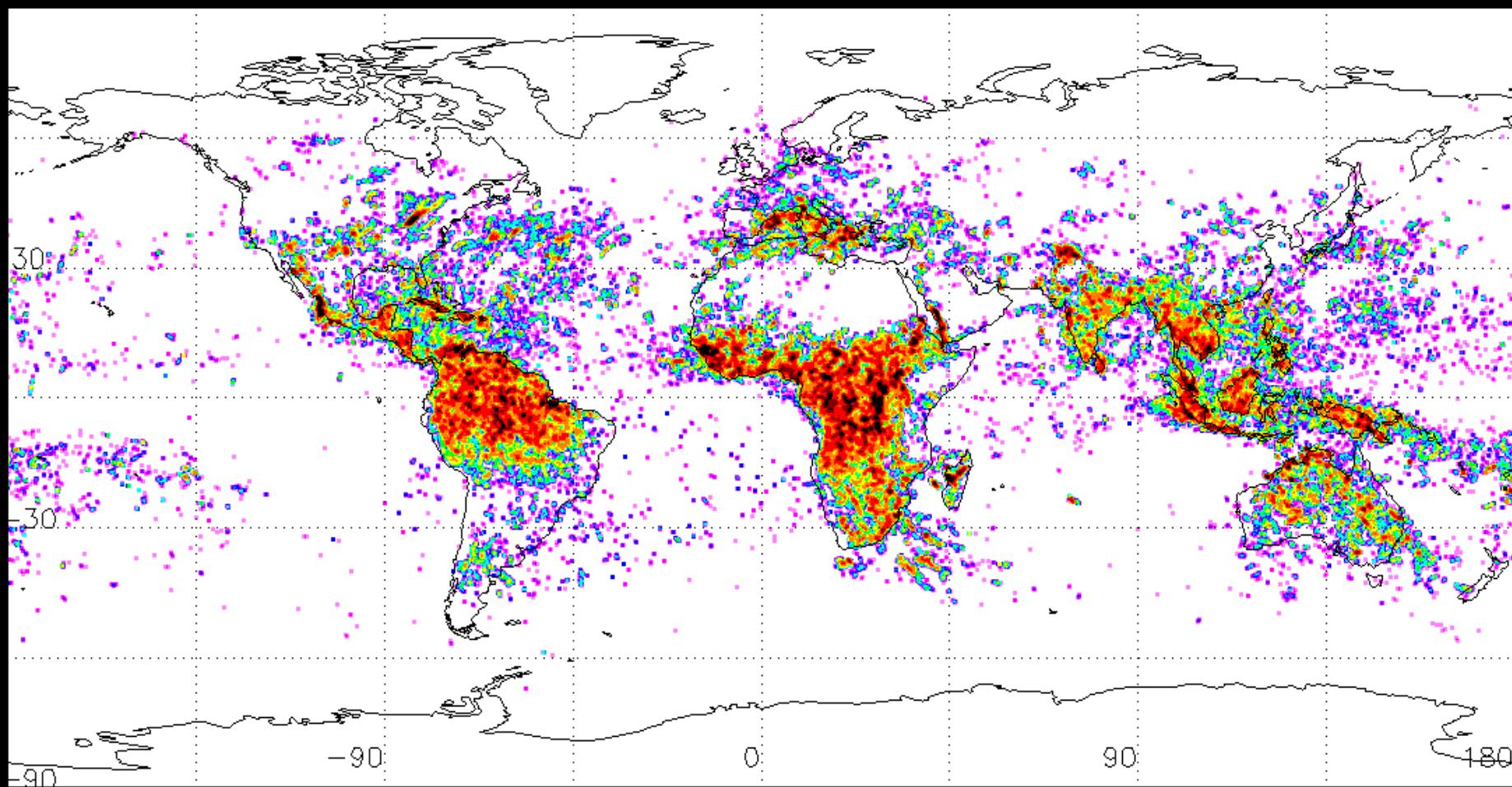
The flash propagates toward the Earth when the electric field gradient in the lower regions of the cloud is stronger in the downward direction

Clouds and Lightning

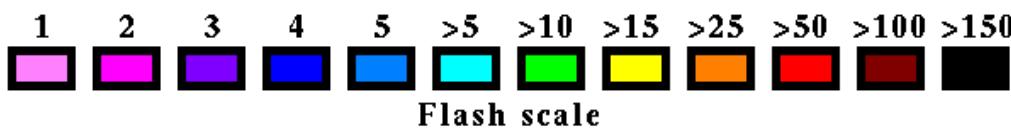


The most lightning flashes appear to last only a fraction of a second, many strikes are actually a series of shorter duration bolts, 5 up to 25 or more.

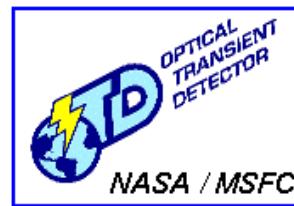
World's Lightning Recorded Data Map



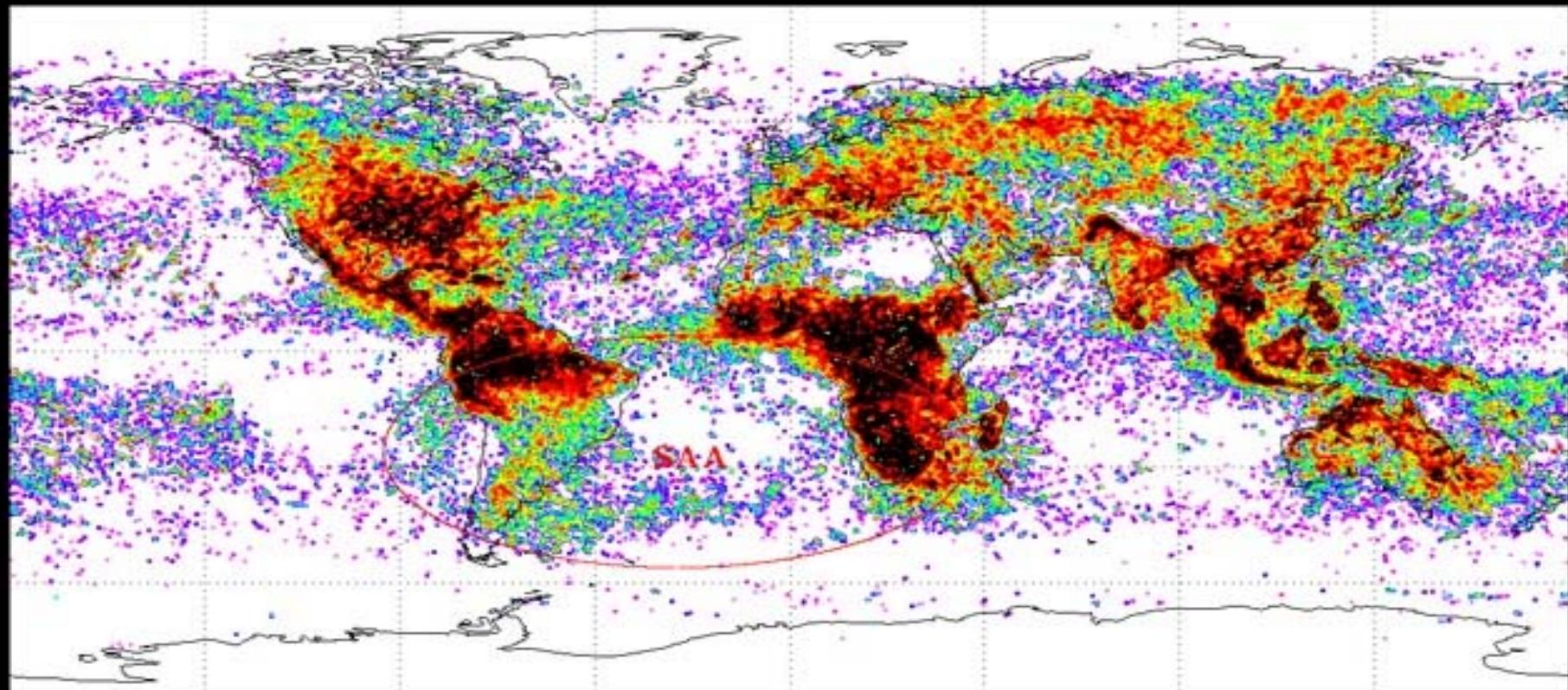
Orbits	904
Areas	43568
Flashes	229678
Groups	1164369
Events	2454938
(Created :	02/15/100)



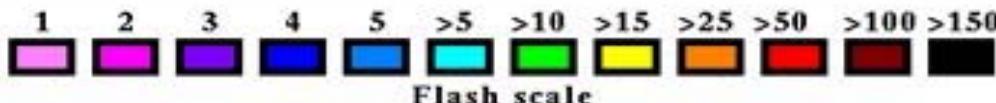
1999 September, October, November



World's Lightning Recorded Data Map



Orbits	4205
Areas	197869
Flashes	1011306
Groups	4743464
Events	8992102
(Created : 05/06/96)	

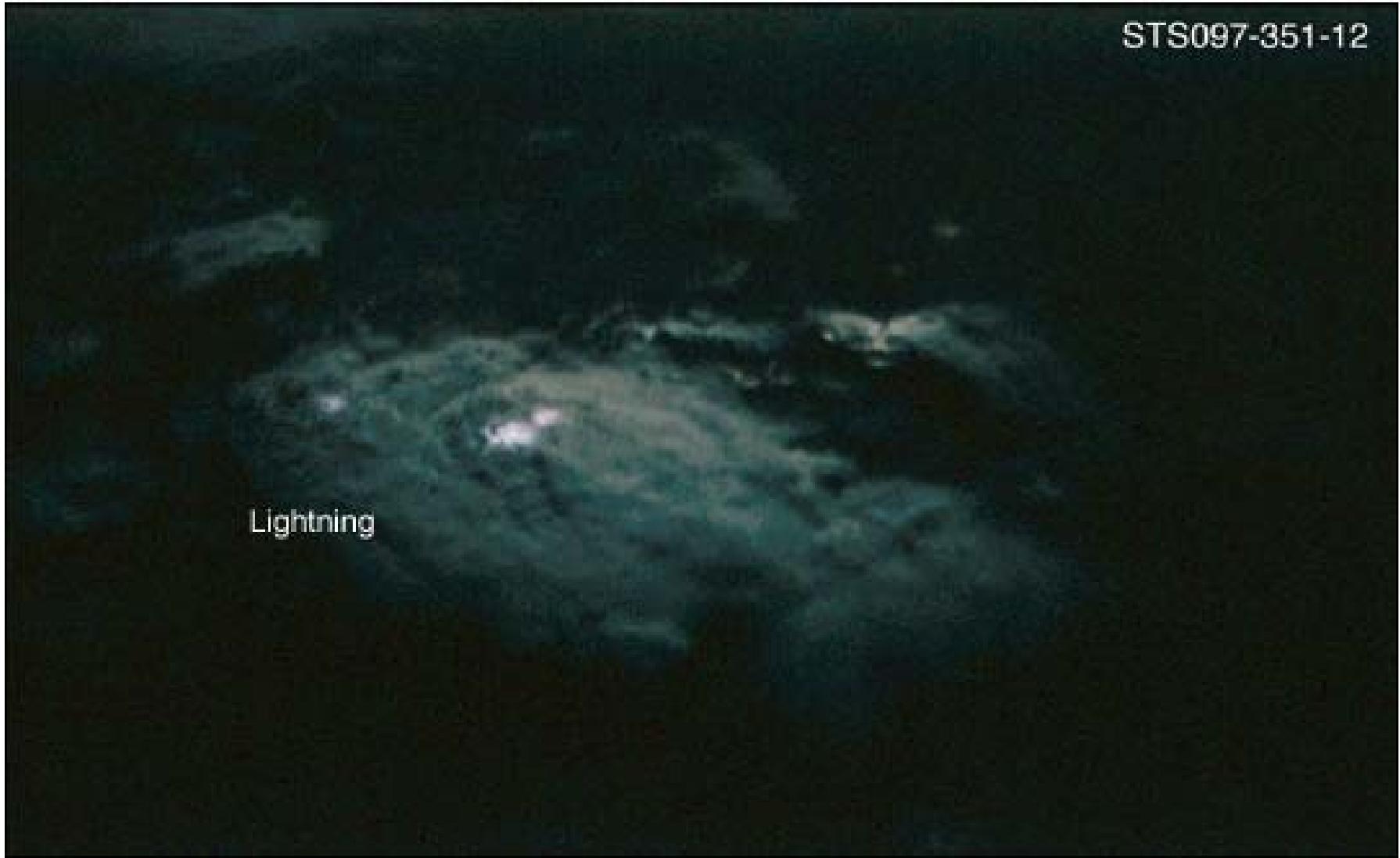


1995 May – 1996 April

One Million Lightning Flashes

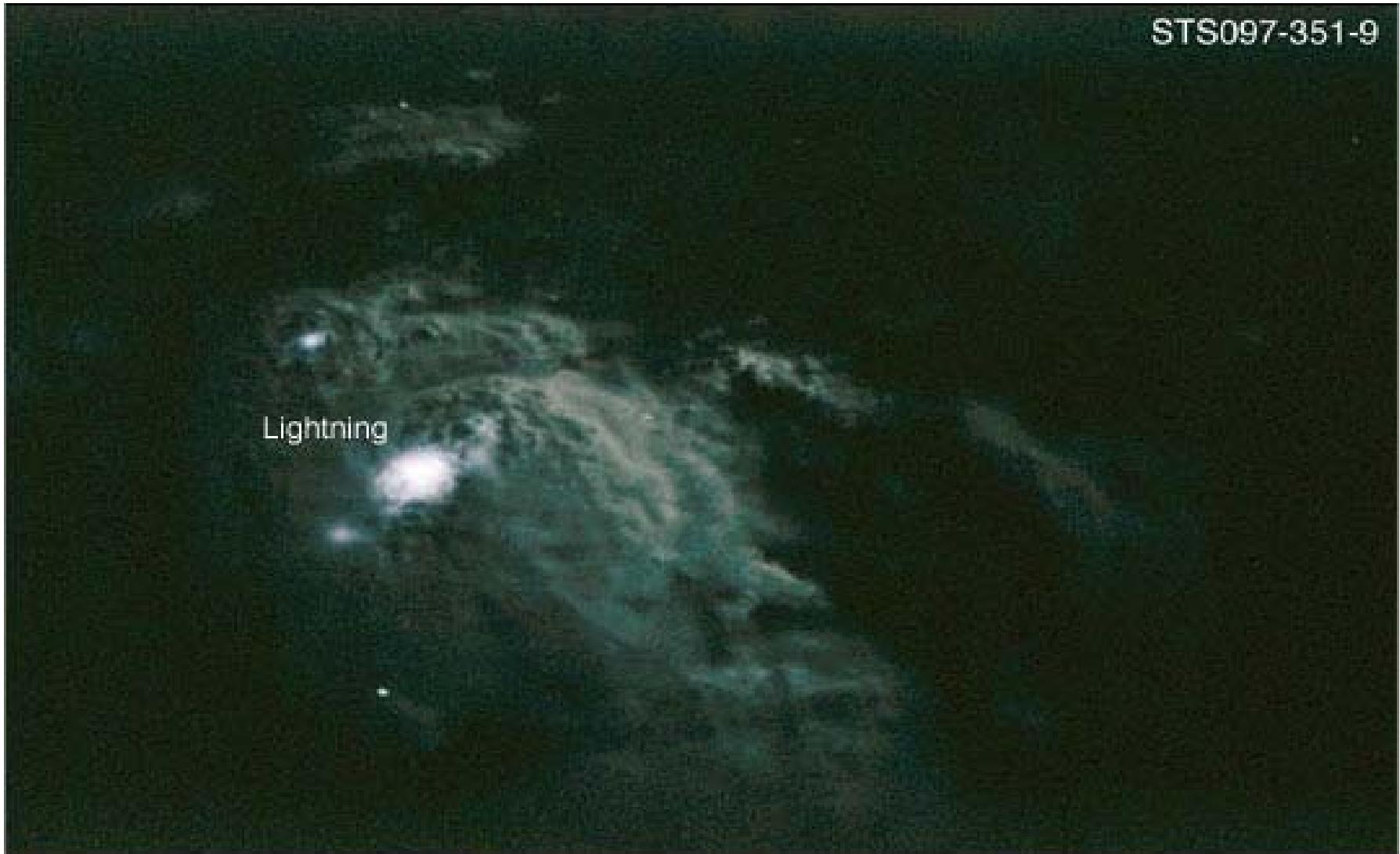


The STS-97 Space Shuttle flew over equatorial Africa



These are two images of lightning were taken 9 seconds apart as the STS-97 Space Shuttle flew over equatorial Africa, Lake Volta on December 11, 2000.

The STS-97 Space Shuttle flew over equatorial Africa



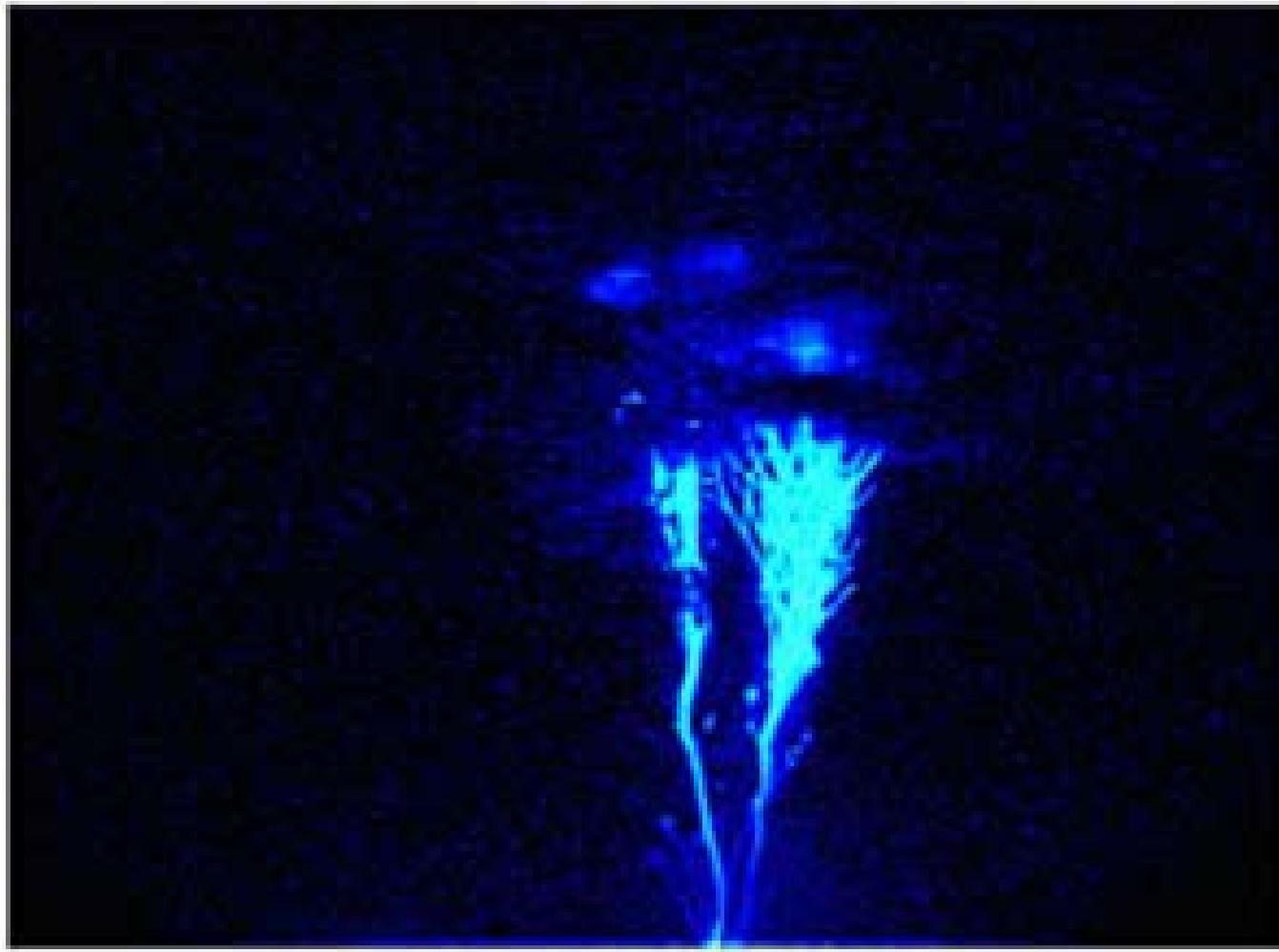
This image is a large thunderstorm, 20 km across, illuminated by a full Moon and frequent bursts of lightning are the white spots.

High-altitude Lightning



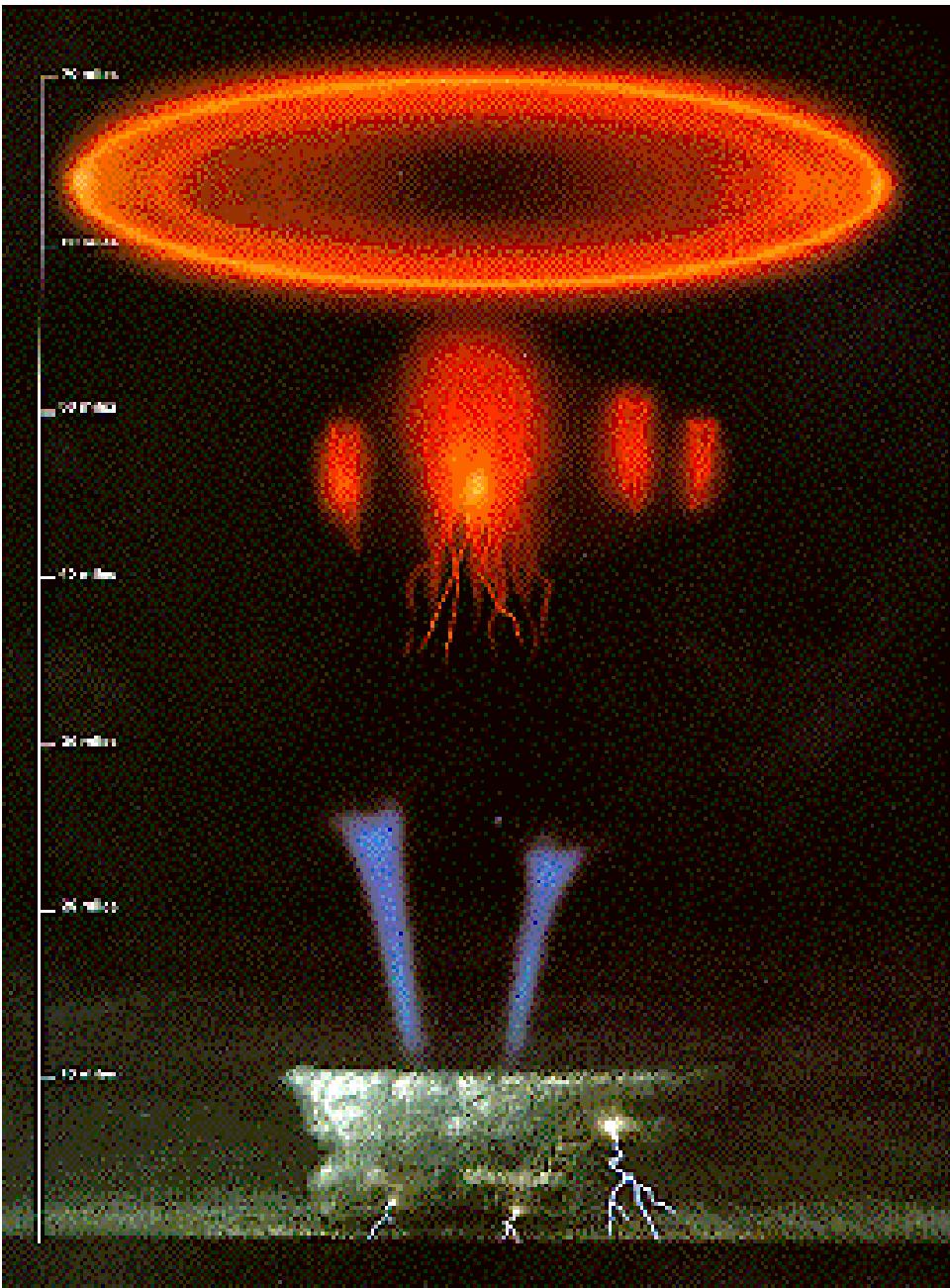
High-altitude lightning are recently discovered colored flashes of light high above thunderstorms. Playful names such as "red sprites," "blue jets," and "green elves" have been given to these distinctly different forms of lightning. They shoot up from the tops of thunderstorms about the same moment as the lightning discharges within the storm cloud.

The Schumann Resonance and the blue jets



Starting at a cloud top 16 kilometers in altitude, a tree of fire shot up, its lightning branching more and more as it rose to a terminal height of over 70 kilometers, and at the point at which the electrical conductivity drops off sharply in the equatorial regions and looks like an electrified palm tree.

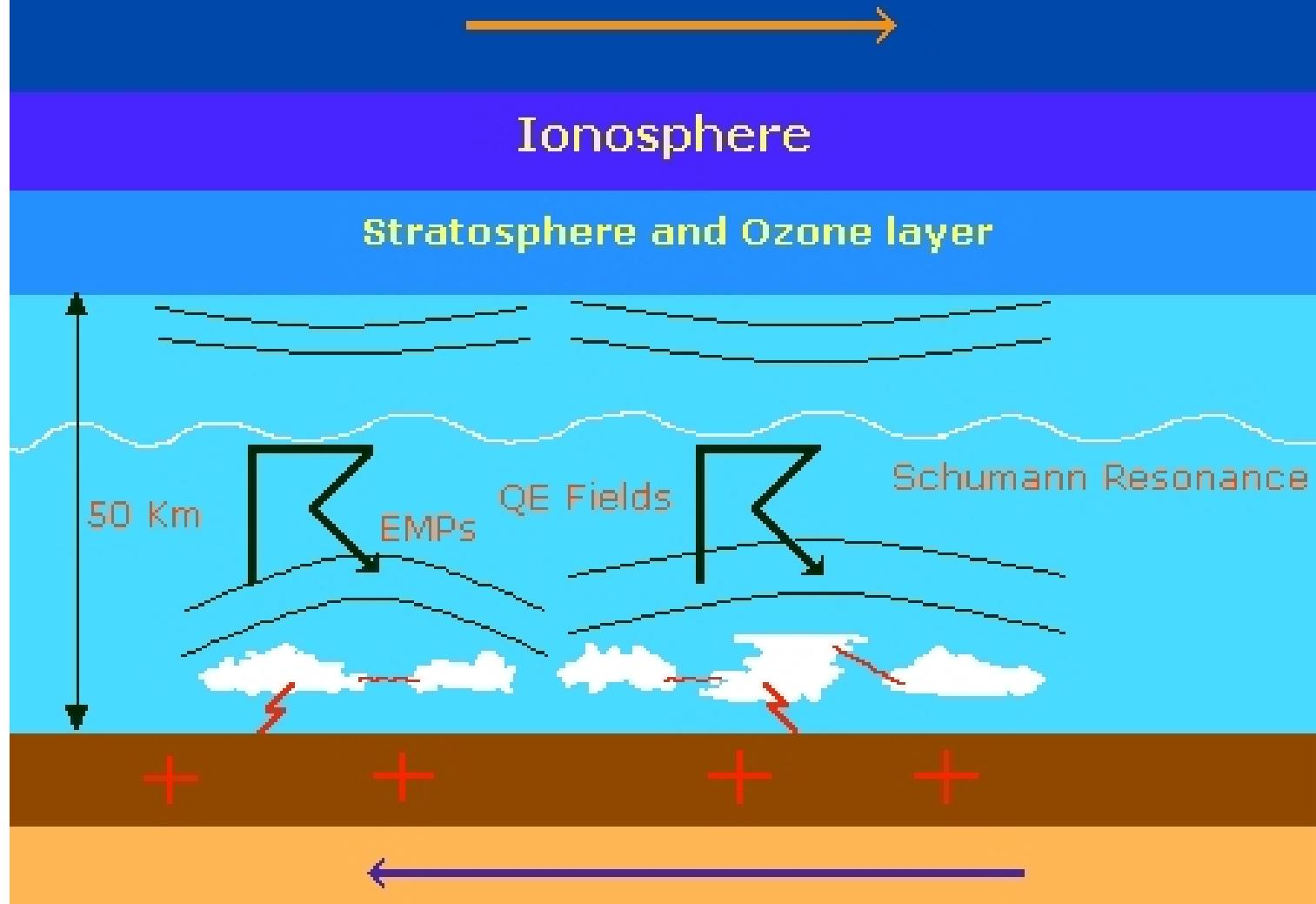
The major Electromagnetic phenomena of the Earth's atmosphere



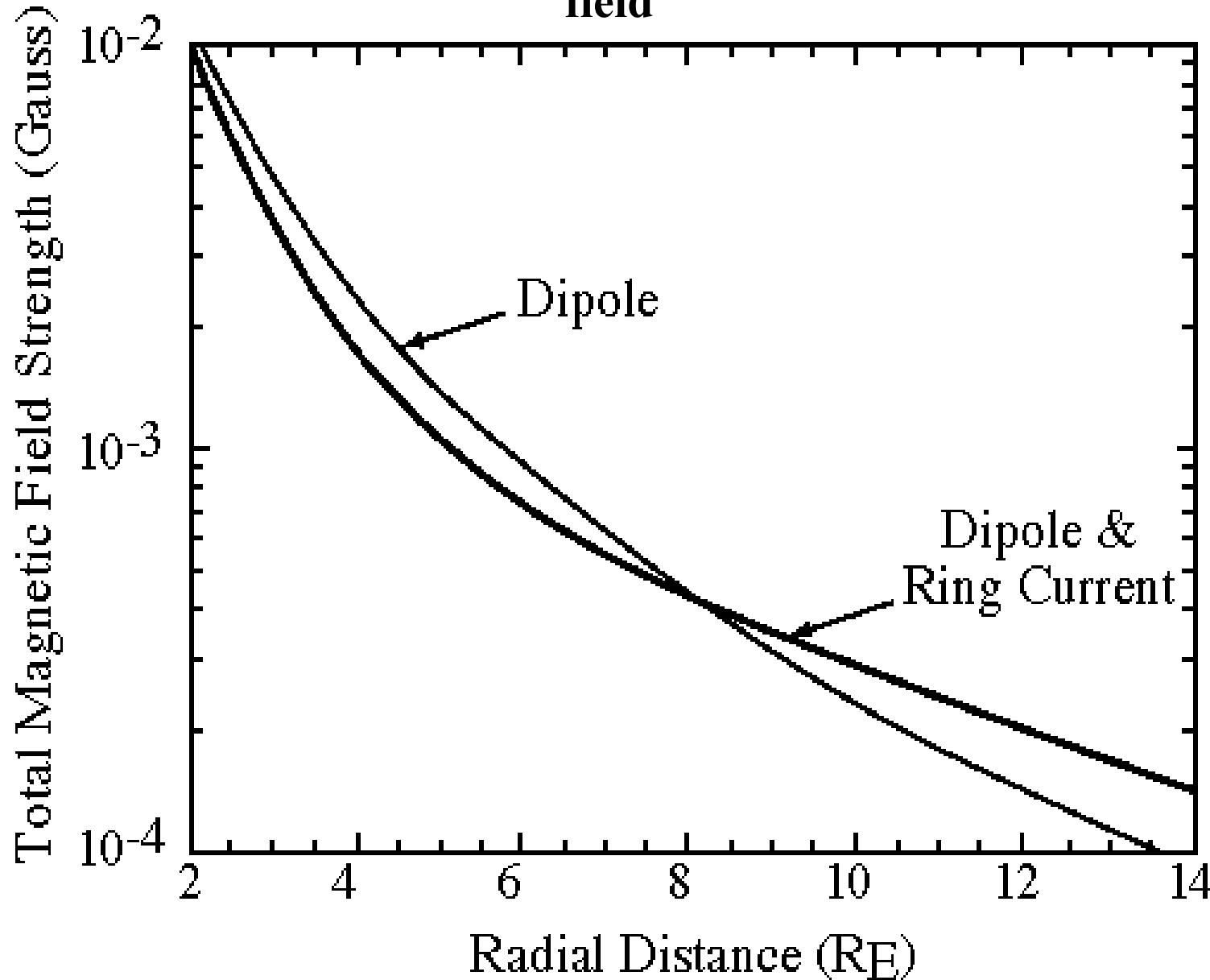
- Ionosphere main level – 95 Km
- Base of Ionosphere – 75 km
- Ozone layer level – 50 Km
- Top of Stratosphere – 30 Km
- Top of storm clouds – 15 Km
- Ground level – 0 Km

Schumann Resonance and the electromagnetic waves

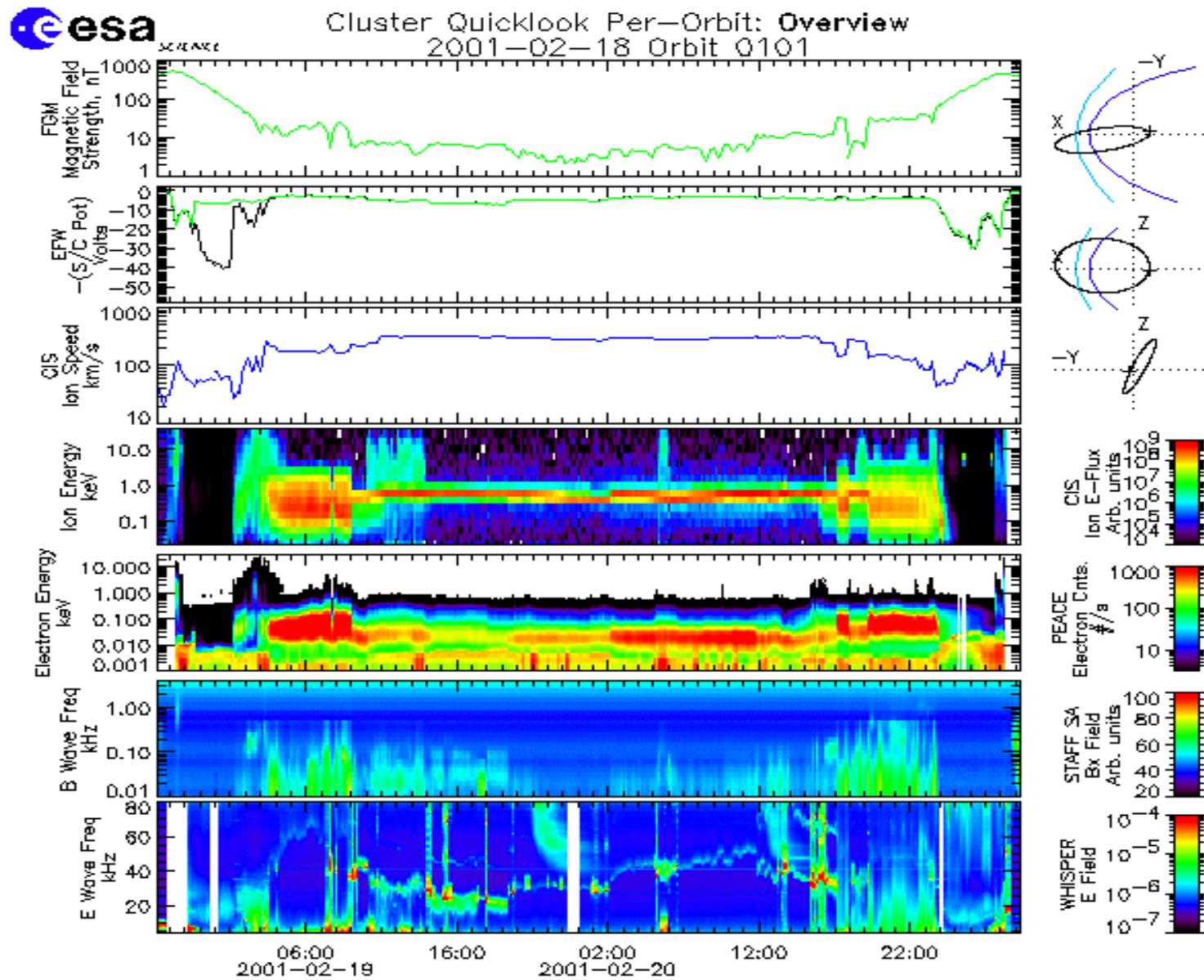
VLF, ELF and ULF ELECTROMAGNETIC WAVES



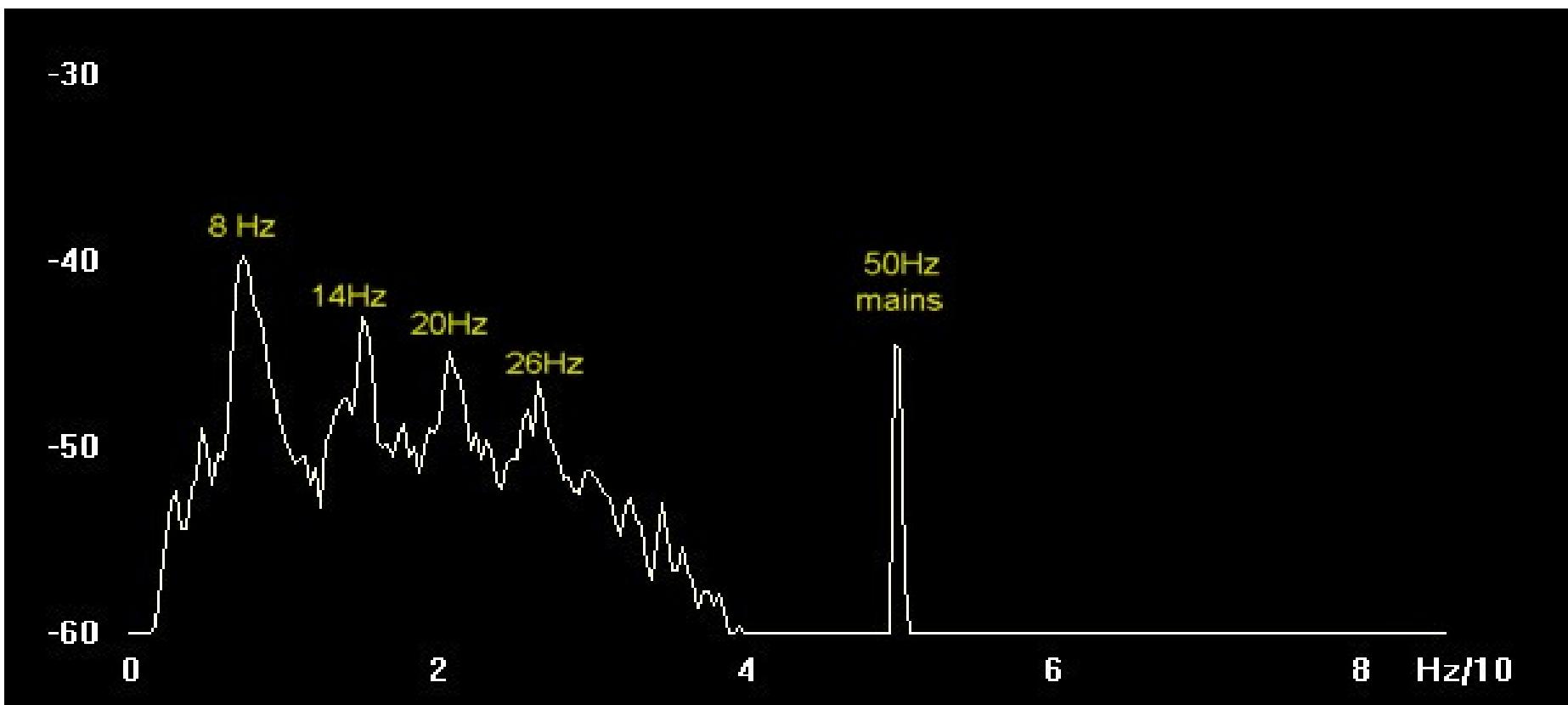
Schumann Resonance and the Earth's electromagnetic field



Schumann Resonance and the Earth's electromagnetic field

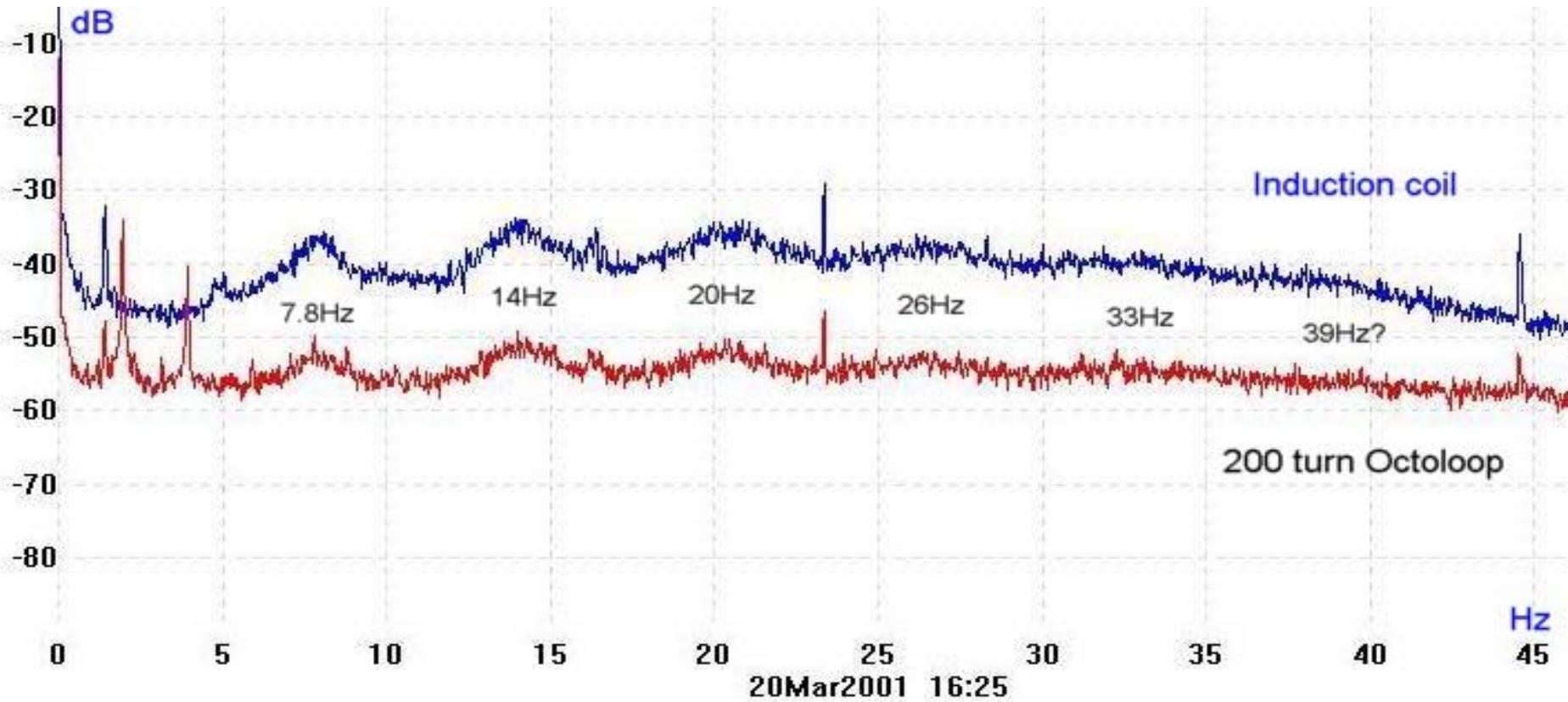


Schumann Resonance electric field frequency



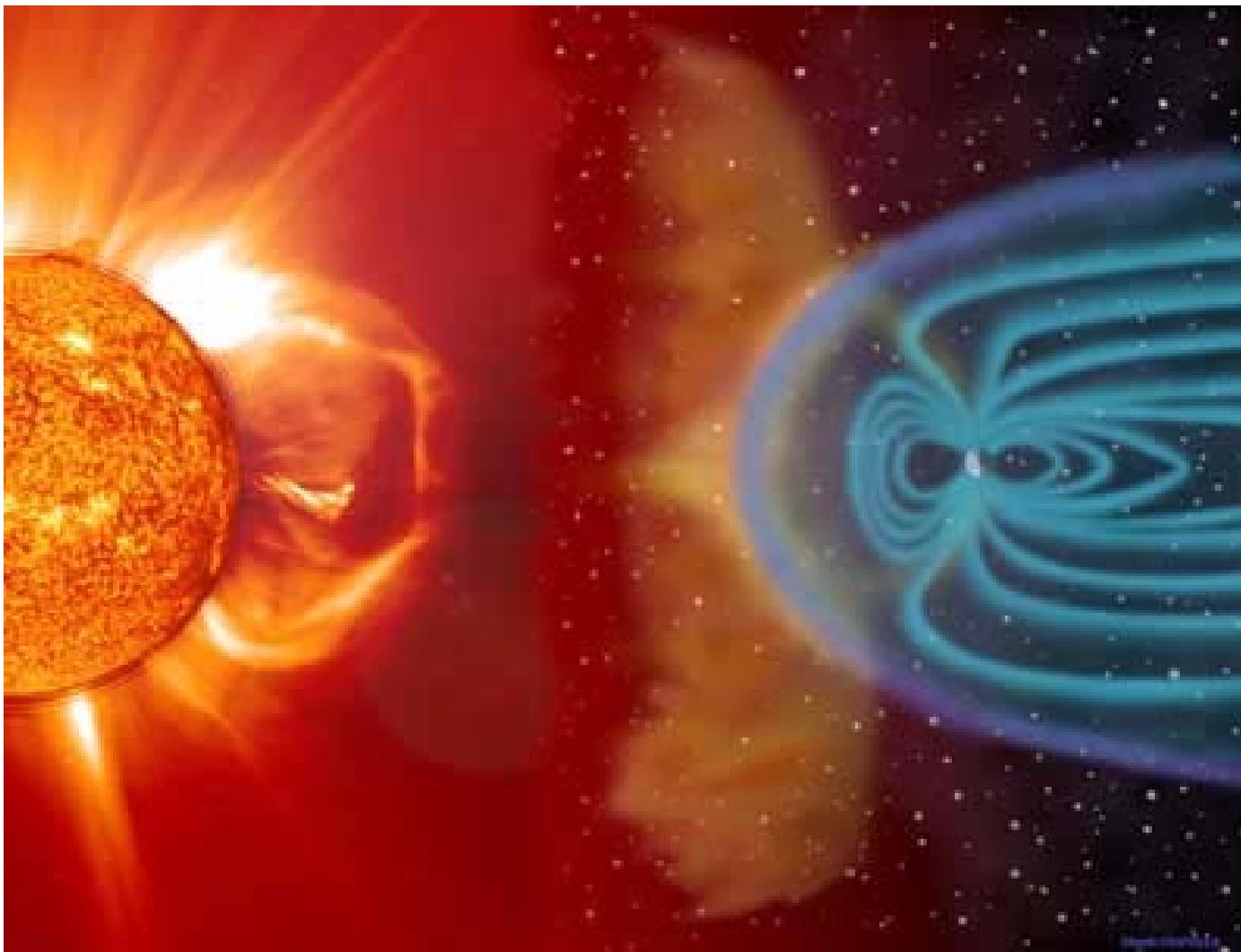
The Schumann Resonance is actually observed by experiments to occur at several frequencies between 6 and 50 cycles per second, and specifically these are: **7.8, 14, 20, 26, 33, 39 and 45 Hertz**, with a daily variation of about ± 0.5 Hertz. The **7.8 Hz** observed fundamental resonance frequency is very close to that rough theoretical estimation of **7.5 Hz**.

Schumann Resonance frequencies



The fundamental frequency of the Schumann Resonance is roughly the fundamental frequency of a spherical shell whose inside boundary is the ground surface of the Earth and the outside boundary is the ionosphere, acting as a spherical shell electromagnetic wave guide cavity. That fundamental frequency thought to be roughly the time it takes electromagnetic radiation to go all the way around the spherical shell that is equal with exactly of 7.5 Hz.

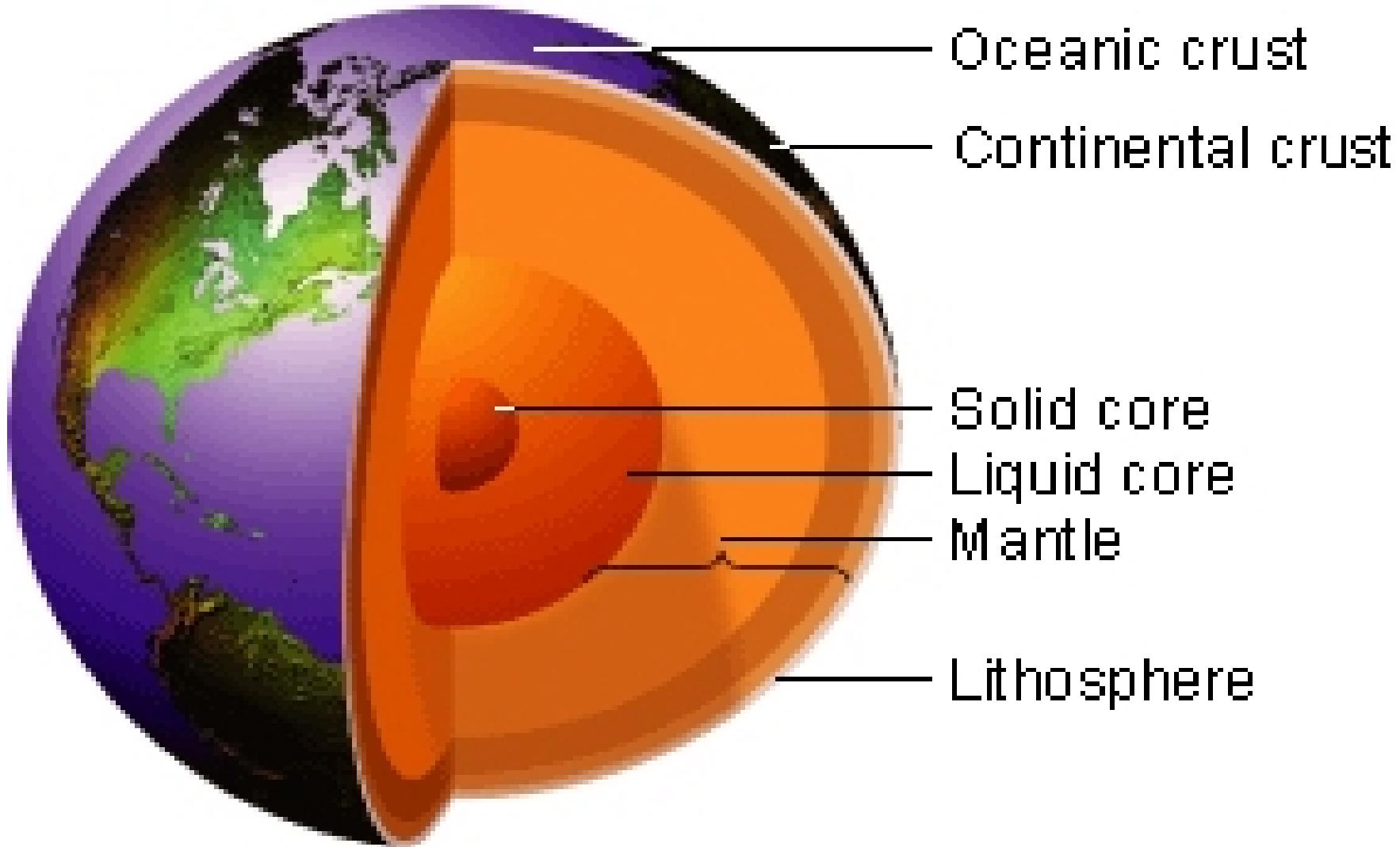
Earth is under a direct influence of the activity on the Sun



The fundamental frequency of the Earth can be also influenced by few important things:

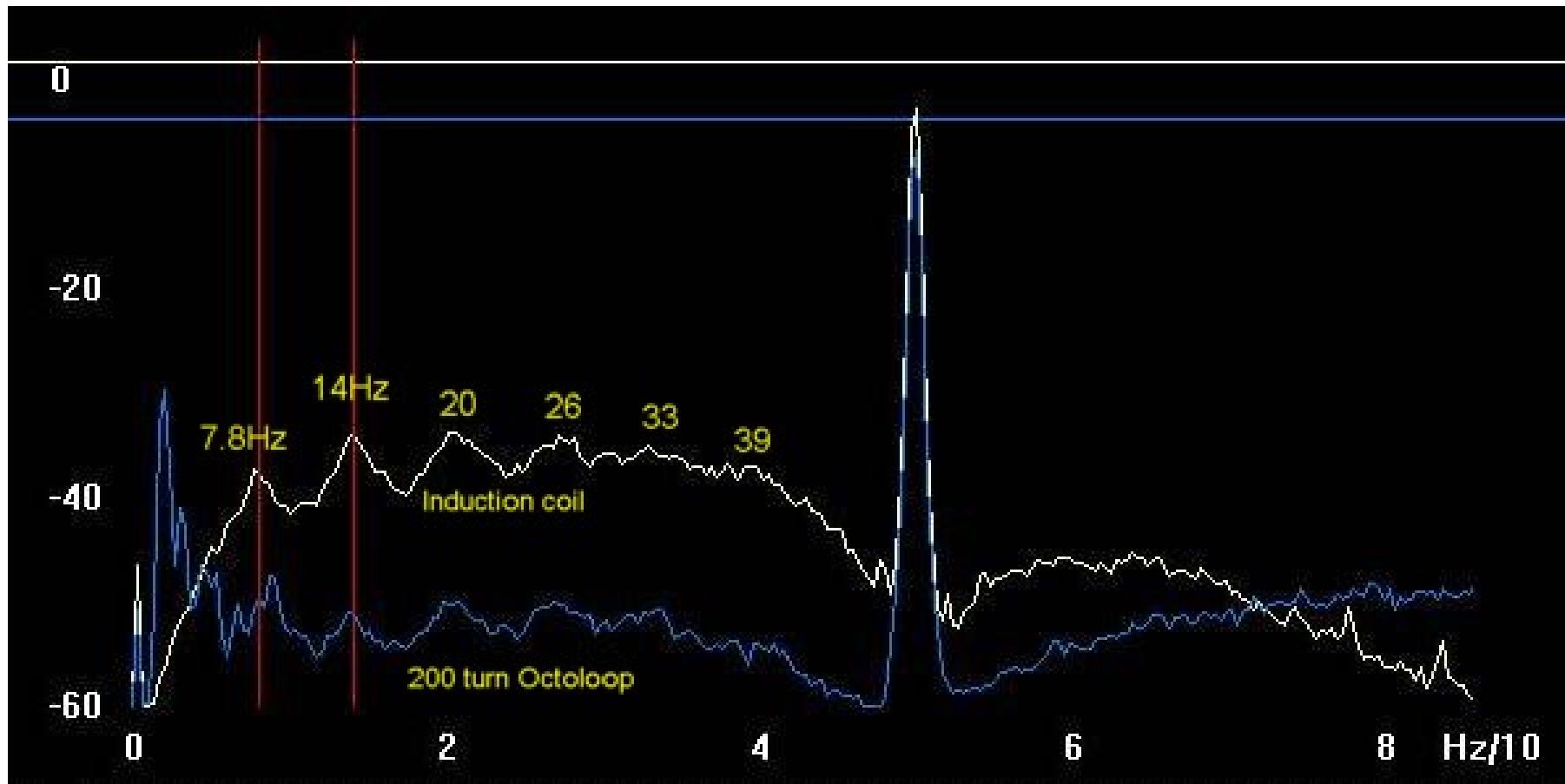
-such as the strength and configuration of Earth's magnetic field; composition and properties of the atmosphere; the location and properties of the ionosphere; the electromagnetic storms from the sun; the sunspot cycle and the local area electromagnetic properties of the Earth such as the earthquake fault areas.

The interior structure of the Earth



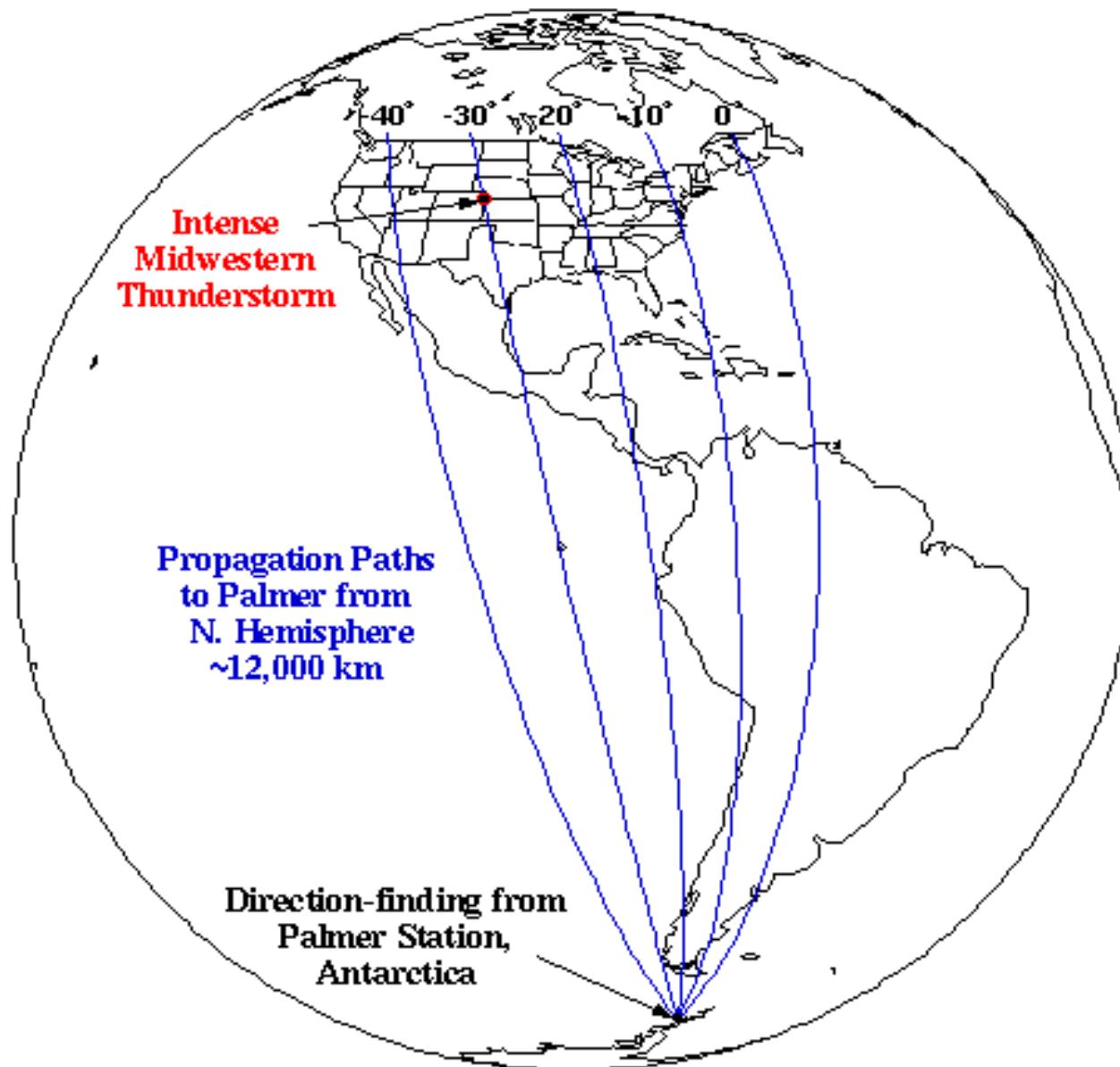
There is a differential physical rotation of the solid inner core with respect to the Earth's surface and that it takes about 400 years for the inner core to make a complete revolution inside the Earth, frequency is only one cycle per 400 years

Schumann Resonance frequencies

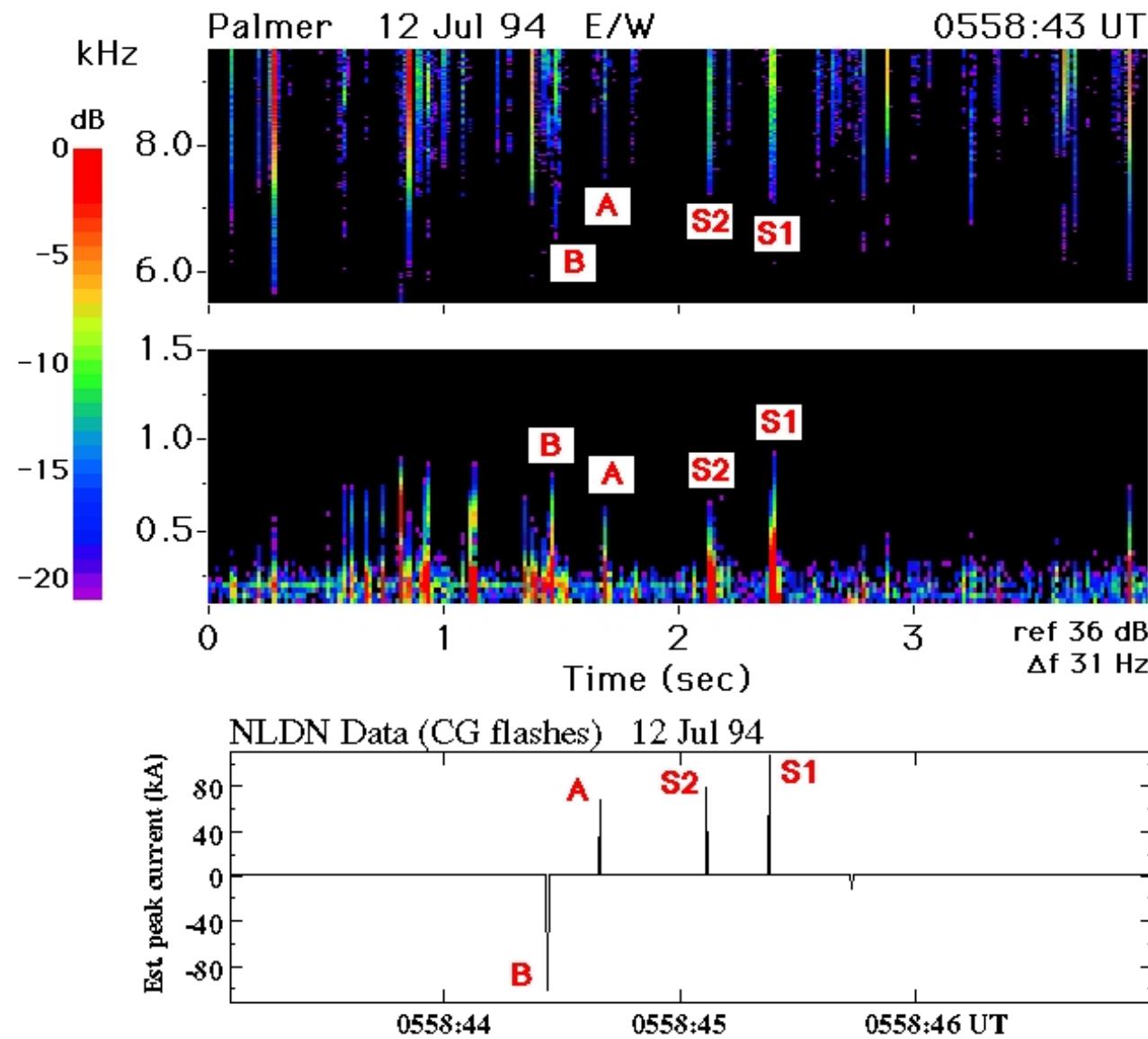


The Schumann Resonance electromagnetic frequencies correspond to the range of all natural frequencies of the planet Earth from its atmosphere and surface to the boundary of its solid inner core.

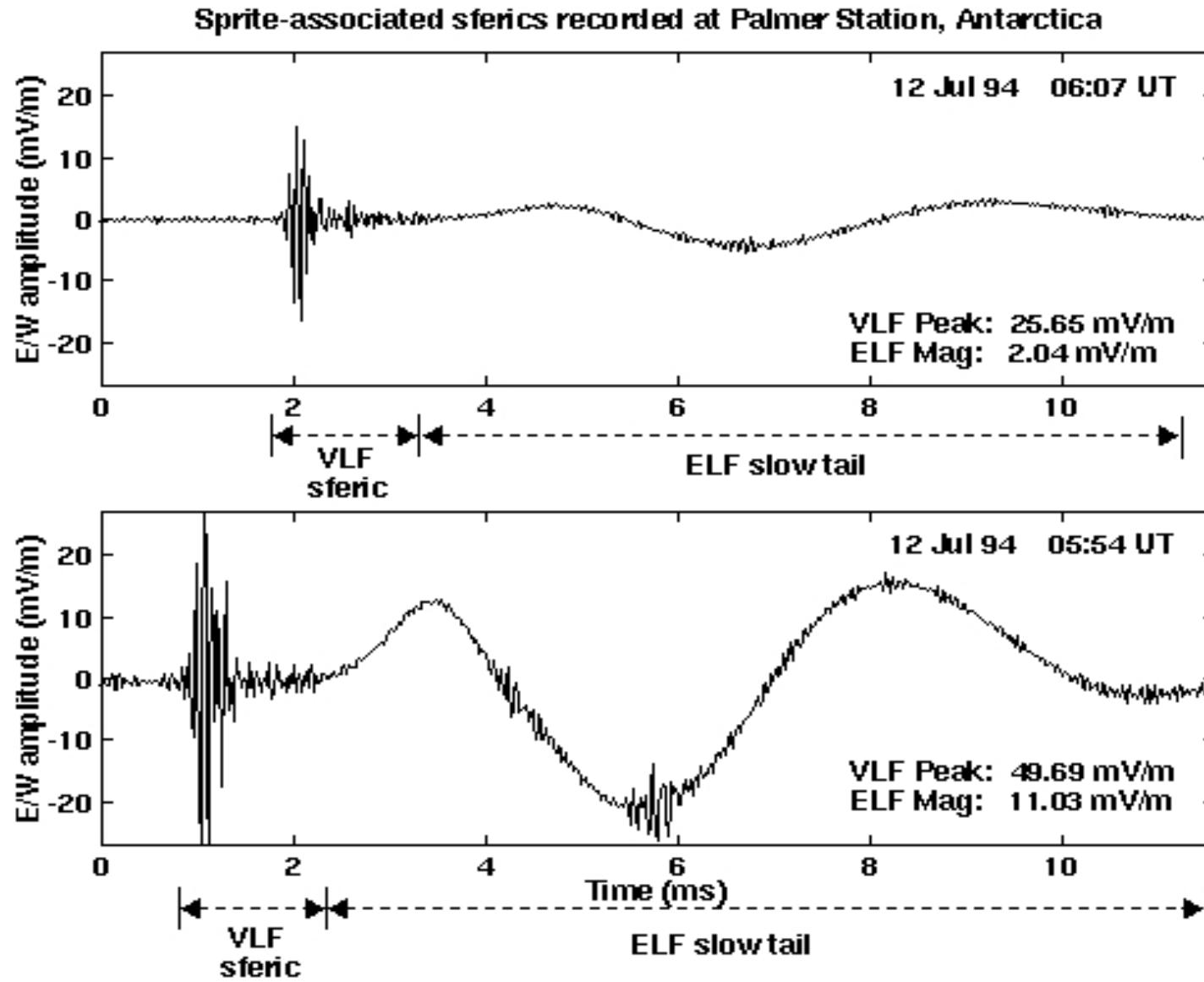
Schumann Resonance detected in the distant blue jets recordings



Schumann Resonance detected in the distant blue jets recordings



Schumann Resonance detected in the distant blue jets recordings



How to detect the Low Altitude Electromagnetic Turbulence



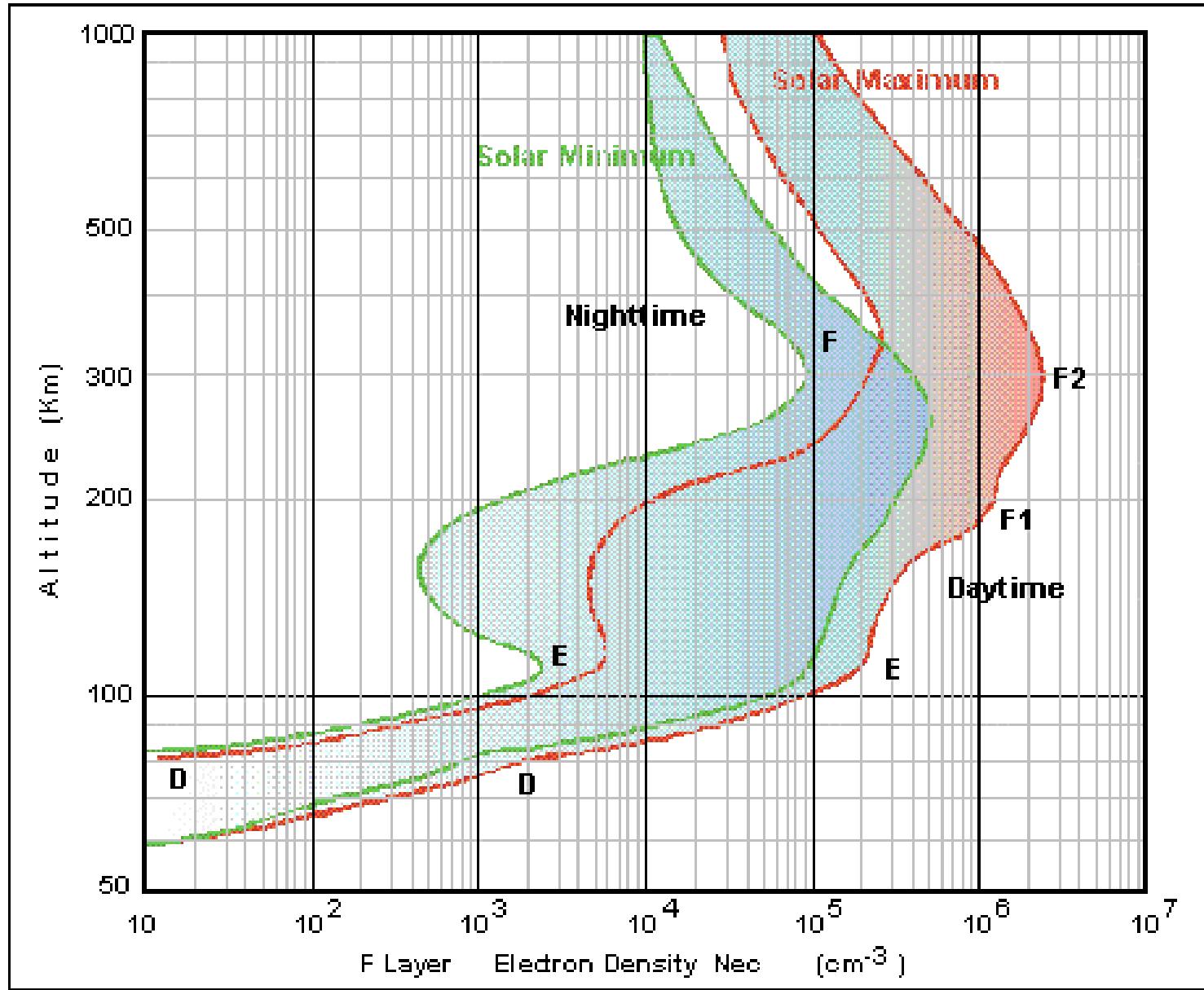
How to detect the Low Altitude Electromagnetic Turbulence ?

ELF receivers and special detectors in space, airborne and at the ground level using all GPS determination for the designated area and recording simultaneous scientific data to be used later by a computer simulation.

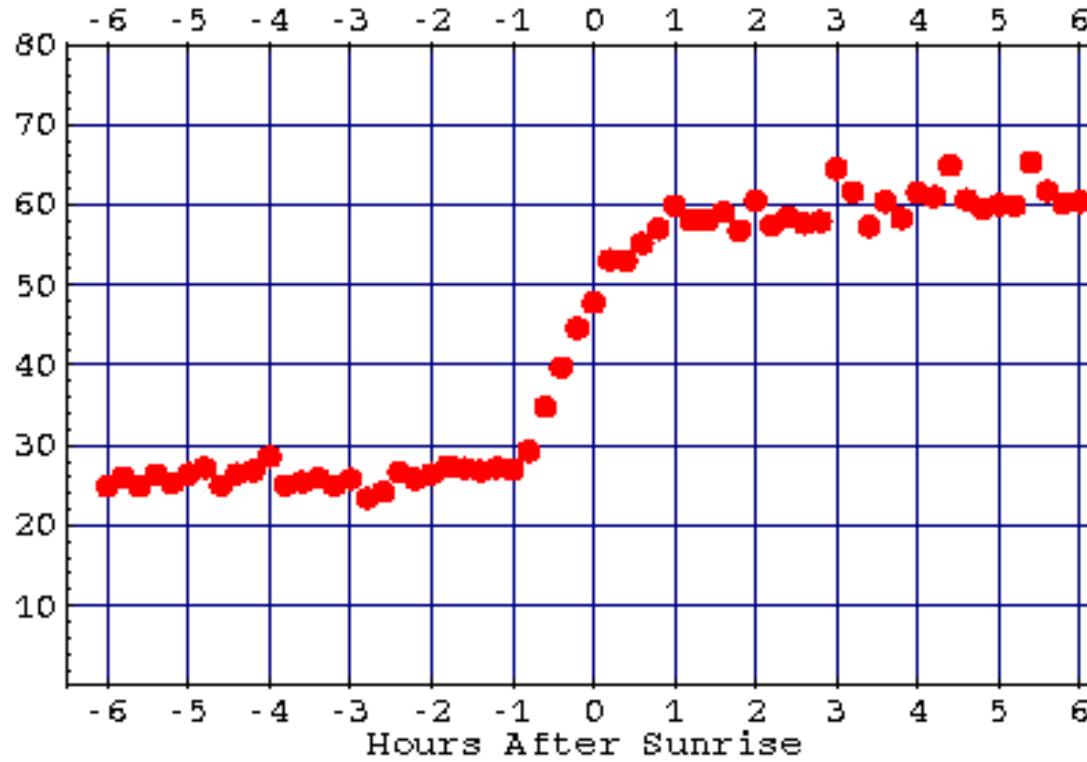
What we may need for an accurate determination of the Low Altitude Electromagnetic Turbulence special behavior over an Earthquake area ?

- Accurate space images over the earthquake targeted areas and the best electromagnetic field determination (VLF, ELF, ULF);
- The ground level electromagnetic field configuration monitoring for the same earthquake area using a the GPS navigation system;
- Simultaneous mid air picture views, the ELF and electromagnetic field configuration determination over the same earthquake area;
- Solar wind activity and its interaction with Earth's high atmosphere monitoring and forecast for any sunspots in the next 24 hours;
- Local Earth's geomagnetic configuration and forecast, including the local area weather forecast that may be able to interfere with the recording data.

The Electromagnetic activity in the Earth's atmosphere

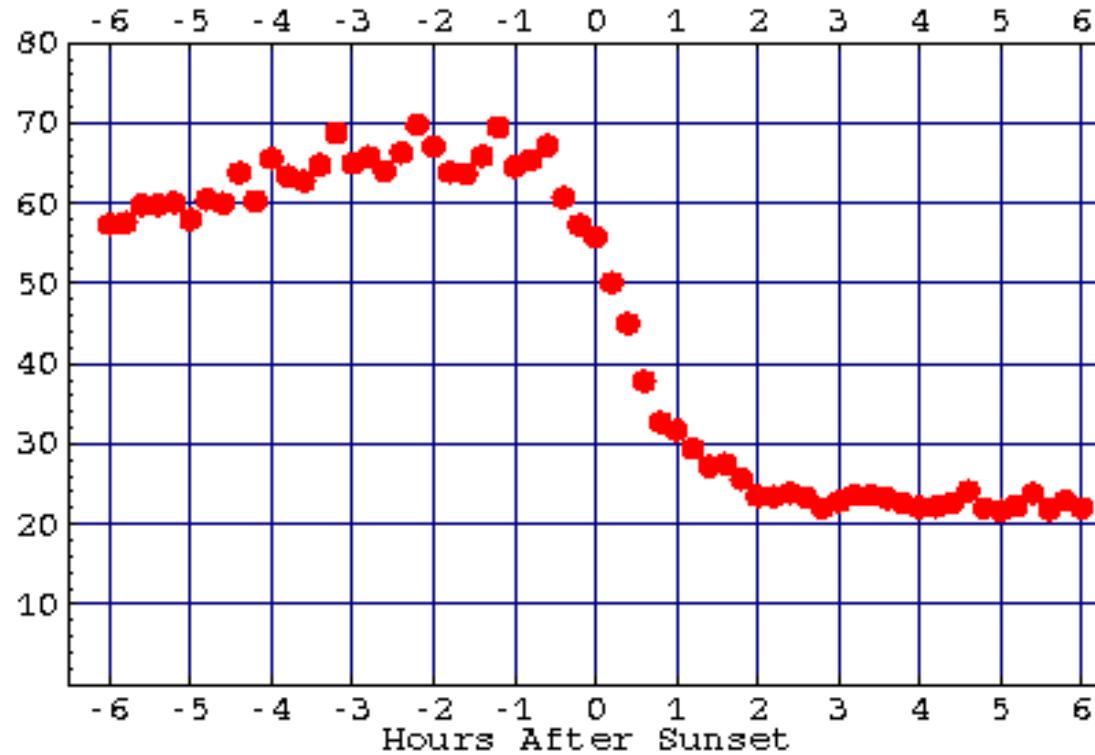


Electric Energy Density Changes at Sunrise and Sunset



These plots show (roughly) the average electric energy density versus time. More precisely, this is the sum of the median amplitudes of the first 8 modes of the Schumann Resonance in the *Earth-ionosphere cavity*, as was measured at the Earth Research Observatory in West Greenwich, Rhode Island, USA. (Source Stan Heckman)

Electric Energy Density Changes at Sunrise and Sunset



The observatory has recorded one power spectral density every 12 minutes for the last 4 years. The value plotted at 0 hours after sunrise is the sum of medians for those 12 minute intervals that include sunrise. The value plotted at 1/5 hour after sunrise is the sum of medians for the 12 minute intervals that immediately followed the interval containing sunrise, and so on. (Source Stan Heckman)

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Thank you,

For more information, please contact me by e-mail at:

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