Part 01

According to my research， I believe the finding water is most effective way to search the life in Goldilocks zone, and the current criteria is great to avoid waste limited resource on ineffective action. The water provide large amount oxygen and hydrogen required for carbon based organics. In Astrobiology, the specialists frequent assumed the potential existing life in the space would be also carbon base, which just like creatures on earth. Since the carbon is lightweight and relatively small in size as molecule, and this nature allow carbon be easy to form the macro-molecular organics which are complex and stable.

To find the life in the universe, the certain framework and screening criteria must be followed. Since the resource for space exploration is limited，and there are almost unlimited number of plants in universe. The scientists must choose the most valuable target in order to improve the probability of success. The extreme life like silicon based life are much less likely to exist. Furthermore the scientist don‘t know the exact method to detect the extreme life. The earth ecosystem is only sample to explore outer life. Therefore all researches must be based on earth.

Part 02

In ancient time, the humid atmosphere and warm ocean may exist in the mars. Since some researcher believe that geological activity of Mars is much more instance than today. The massive eruption filled the atmosphere of Mars with large amounts of carbon dioxide and water vapor, which brings a dramatic greenhouse effect. Therefore the temperature of early Mars were much higher than today, that could maintain liquid water on the surface Mars such as ocean. But Mars has only 1/10 the mass of Earth, and cannot maintain a dense atmosphere like Earth. The atmospheric pressure on Mars is only 6/1000 of atmospheric pressure on Earth's sea level.The water on the surface of Mars may evaporate rapidly or freeze into ice, since the water is under the low pressure. Therefore water is hard to form a liquid for a long period on Mars.

While we don’t need to wait next era, there may still some liquid water exit on mars.

In 2011, NASA released a series of images taken by Mars Reconnaissance Orbiter. The picture shows some significant recurring slope lineae in the mid-low latitudes of the southern hemisphere of Mars，which means that some kinds of liquid may be evaporated from Mars. Scientist speculate that a significant amount is dissolved in the water which will reduce the freezing temperature of water drastically. The NASA release further evidence in 2015, the researchers has prove the existence of Hydrated salt in recurring slope lineae by spectrum.

Part 03

The main purpose of launching Phoenix robotic spacecraft is to achieve space exploration mission on Mars. There are two main goal for the mission. Firstly Nasa want to study the geology history of water, which will would assist the research of past climate change on Mars. Secondly Phoenix is expect to evaluate potential [planetary habitability](https://en.wikipedia.org/wiki/Planetary_habitability" \o "Planetary habitability) in the ice-soil boundary on Mars. After a successful landing on May 25, 2008, Phoenix sent back a large amount of data, which revealed the water and climate cycle composition, the north pole natural environment, and characteristics of the soil on the surface of Mars. The two thousand observations of [methane gas on Mars](https://en.wikipedia.org/wiki/Atmosphere_of_Mars" \l "Methane" \o "Atmosphere of Mars) by message transferred by Phoenix which is crucial to determine the biological potential or [habitability](https://en.wikipedia.org/wiki/Planetary_habitability" \o "Planetary habitability) of the Martian arctic's soils.