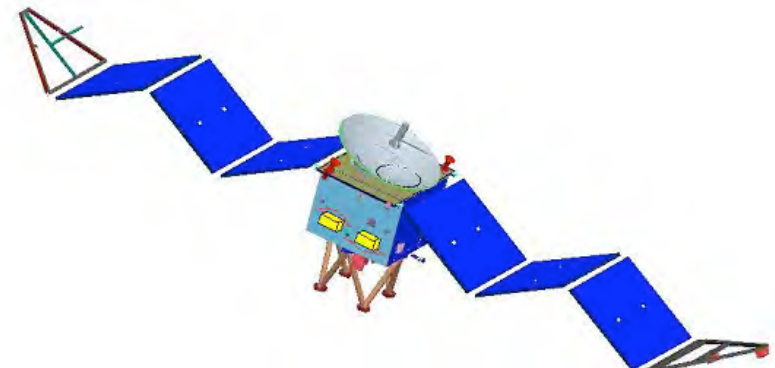
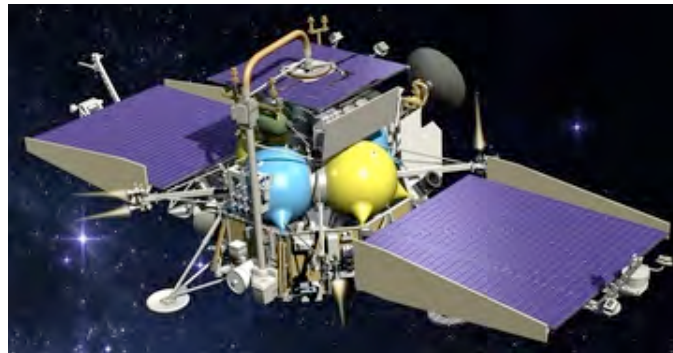


Swedish Institute of Space Physics (Institutet för rymdfysik, IRF)

Participation in the Phobos-Grunt/Yinghuo-1 mission to Mars



Two spacecraft

Phobos-Grunt:

- Russian sample return mission from Phobos
- Orbit to reach Phobos

Yinghuo-1:

- First Chinese spacecraft going to Mars
- Sub-satellite of Phobos-Grunt
- Released into independent highly elliptical orbit (800km x 80000km, 3 days)

Plasma measurements with Phobos Grunt & Yinghuo-1

IRF provides three identical instruments on two spacecraft to study the Martian plasma environment far into the Martian plasma tail:

- Two ion mass analyzers on Yinghuo-1
 - extended field of view
- One ion mass analyzer on Phobos Grunt
 - standard field of view

YPP: a joint project to study Mars

The Yinghuo Plasma Package (YPP) instrument is a joint project between:

- ❑ Center for Space Science and Applied Research (CSSAR), Chinese Academy of Sciences, Beijing, China
(PI: Prof. Wang Shijin)
- ❑ Swedish Institute of Space Physics (IRF), Kiruna, Sweden
(PI: Prof. Stas Barabash)



YPP

YPP is designed to study the plasma environment around Mars.

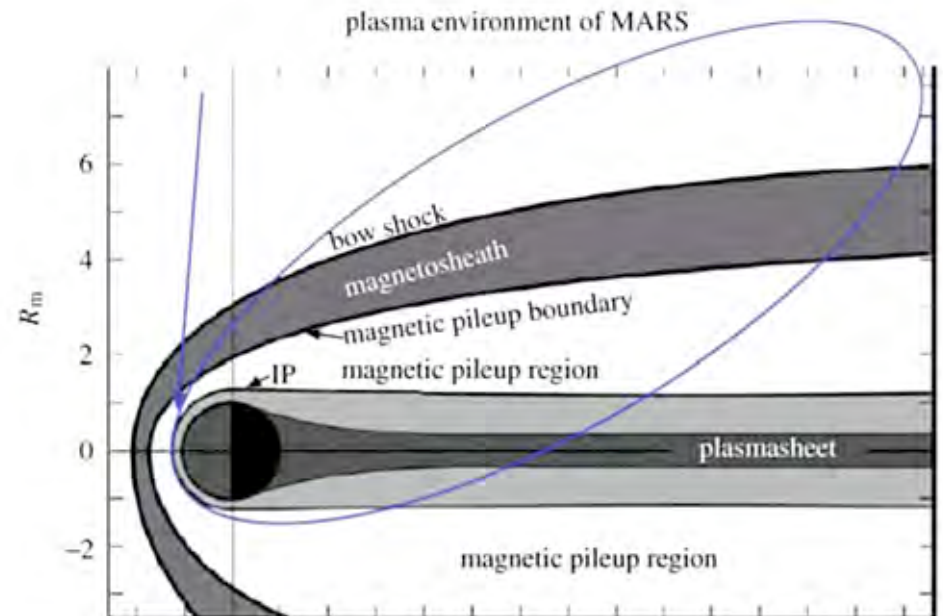
Yinghuo-1 is ideal for this purpose because of its highly elliptical orbit.

Together with Phobos-Grunt, true multi-point measurements will be possible

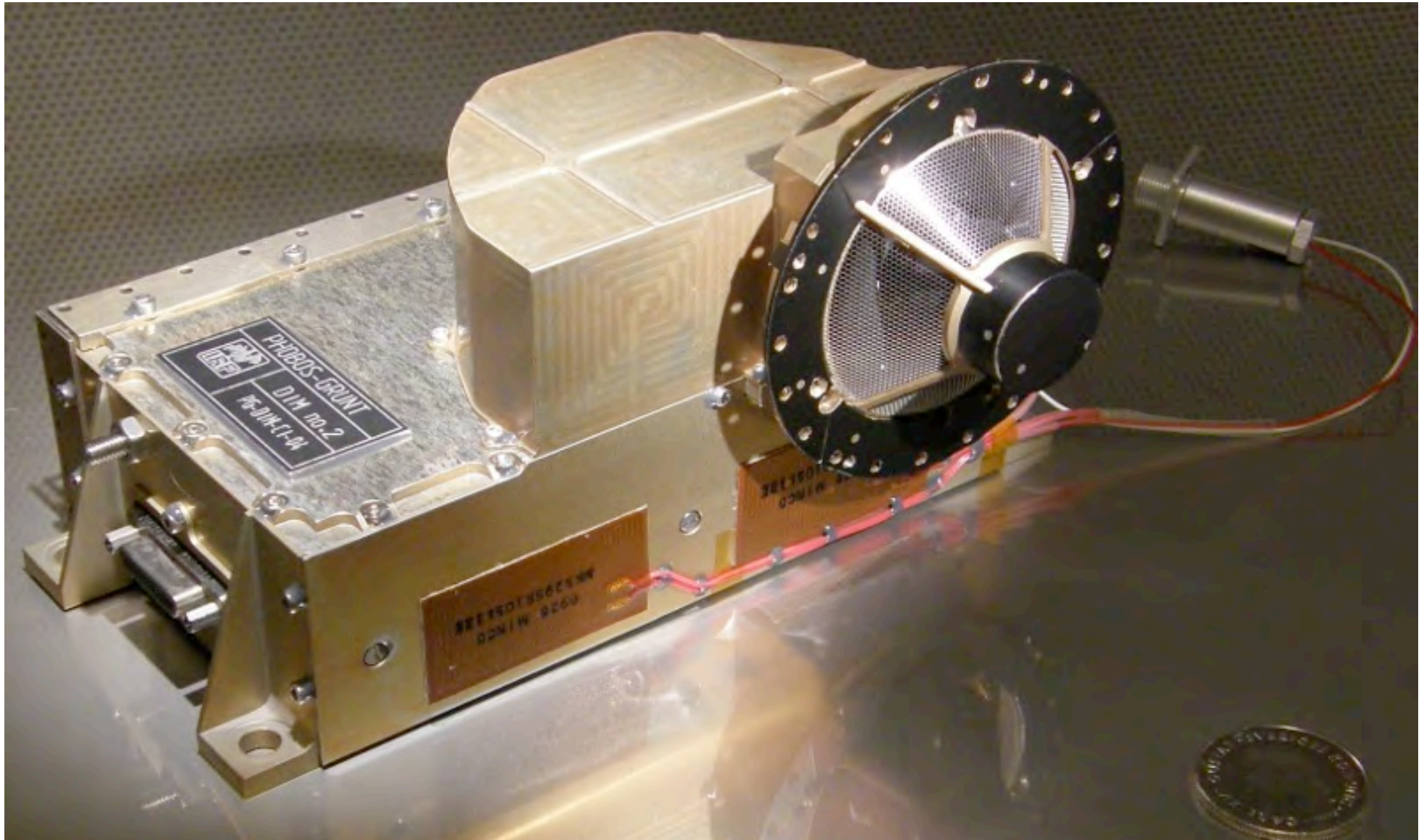
Orbit of Yinghuo-1

Yinghuo-1 will be inserted into an elliptical orbit around Mars that ranges from 800 km to 80,000 km.

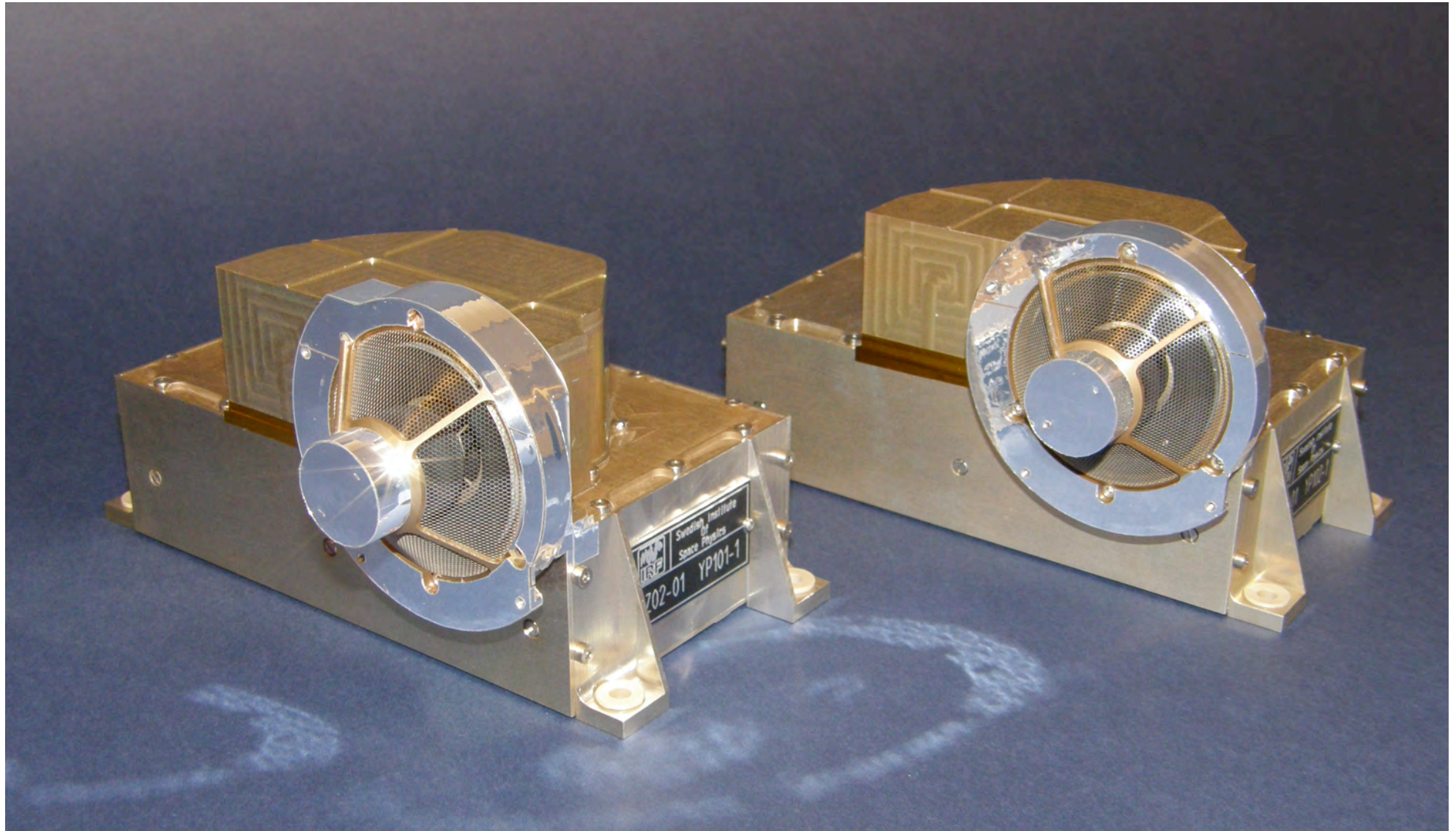
Credit: Zhao Hua, 2008



DIM (Detector for Ions at Mars)



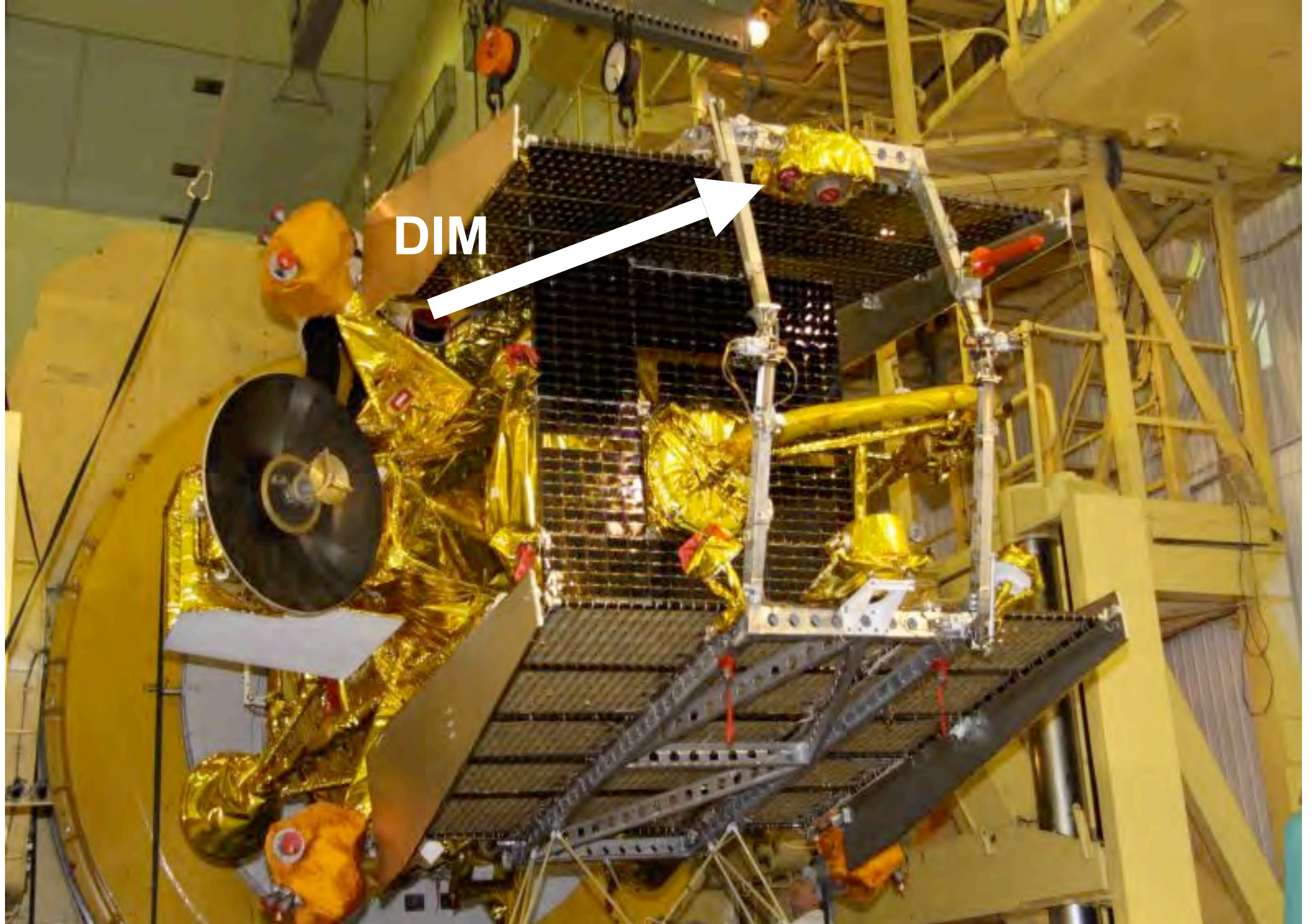
YPP (Yinghuo Plasma Package)



Sensor Performance

Miniature sensor developed at IRF:

- Energy range: $20\text{eV}/q$.. $10\text{keV}/q$
- Energy resolution: 7%
- Mass groups: 1, 2, 4, 8, 16, 32 amu
- FoV: 2π divided in 8 pixels
- Mass: 600g
- Geometric factor w/o eff.: $\sim 1.4\text{e-}4 \text{ cm}^2 \text{ sr eV/eV}$



DIM



Timeline

- Launch:
8 November 2011 from Baikonur/Kazakhstan
- Orbit Insertion at Mars:
12 October 2012
- Nominal mission:
2 years (Yinghuo-1)
0.5 years (Phobos Grunt)