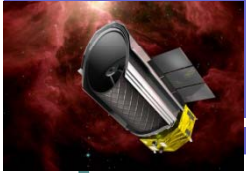


# Discussion items

## 総合討論項目

17<sup>th</sup> Dec. 2010 @ SPiCA WS 2010

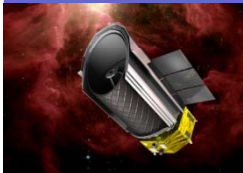


# This Workshop

- Purpose of the workshop
  - To discuss the scientific importance of the **proposed instruments**. Not *presentations of 'wish list'*
  - To discuss which function(s) of the instrument must be required to achieve the scientific goal.
- Wrap-up of 'the 1<sup>st</sup>-stage review'
  - Based on the presentations & discussions in this workshop, the 1<sup>st</sup> stage panel will prepare the final 'panel recommendation report' by the end of December.

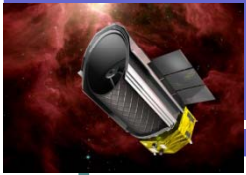


**FPC**



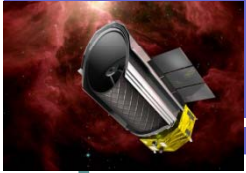
# Issues for FPC-S (1)

- Parallel mode observations
  - How large it should be?
    - Deep (1deg<sup>2</sup>), wide (50deg<sup>2</sup>), shallow-wide (~400deg<sup>2</sup> = 1000 hours) (by Im)
    - How about JWST? – go as wide as possible to find a rare objects (to be followed-up by TMT) (by Iwata)
    - How wide? Critically depends on the overhead (e.g. spacecraft slewing time, etc.)
  - What `parallel' means?
    - MCS-LRS-S and FPC-S(LVF) in slow-scan mode
    - MCS-WFC and FPC-S(imaging) (by Tsumura)



## Issues for FPC-S (2)

- Technical Feasibility of the parallel obs.
  - Consistency with spacecraft resources: Data rate, Thermal lifts, electric power, etc.
    - *Parallel in SAFARI observation is not realistic*
    - *JAXA provide FPC team with the current spacecraft resources. KASI will check the feasibility*
  - STA performance at FPC-S waveband
    - Since the requirement is '5um diffraction limit', no guarantee on the image quality below 5um
    - To achieve the image quality at low temperature(<10K) is also a big challenge
- Terminology:
  - Parallel observation → coordinated observation
- Specification of filter bands is quite open



# MIR CAMERA & SPECTROMETER



# issues for MCS (1)

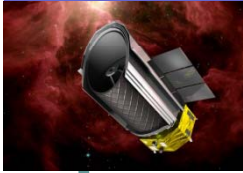
- **WFC:**
  - specification of filter bands (→ contact to Oyabu)
  - Overcome the confusion limit - e.g. gravitational lens (by Goto)
- **LRS issues:**
  - slit width problem
  - High sensitivity is a key issue
  - Wavelength coverage (need of LRS-S)
    - rest 5-15  $\mu\text{m}$  ( $z=0.5-2$ ) → 5-48 $\mu\text{m}$  is desirable (by Imanishi)
    - LRS is quite unique in synergy with Cosmic NIR background study with FPC-S (by Tsumura)
    - The low-resolution spectroscopy at 10-65 $\mu\text{m}$  is unique to SPiCA for the solid state physics of ISM (by Kaneda)



# issues for MCS (2)

- Importance of MRS-S
  - Simultaneous, broad-band coverage (together with MRS-L) (by Sakon)
    - powerful for middle-aged SNe (by Tanaka)
    - Time variability (by GANDHI)
  - MRS Specifications depends on the existence /specifications of LRS
  - SAFARI  $R=4000$  at 35  $\mu\text{m}$  -- similar  $R$  for MRS is desirable
- Galactic ISM:
  - what left after Herschel / JWST? (by Kaneda) - 15-60 $\mu\text{m}$  solid physics in ISM? need more investigations!
  - Coverage of MCS-WFC/LRS upto 50 $\mu\text{m}$  will be quite unique Japanese contribution
    - Higher dynamic range than SAFARI
- Need of HRS-S
  - ULIRG CO abs. (by Shirahata),
  - Solar system objects (by Ootsubo)





# Issues for MCS (3)

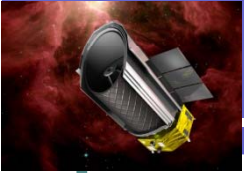
Based on MCS  
team presentation

## Prioritization of functions

- Preference proposed by the MCS team:
  - (1)WFC-L and S, (2)HRS-L, (3)MRS-L and S, (4) LRS-L, (5) LRS-S, (6) HRS-S
  - Any opinions on above?
- MCS team will update the proposal, reflecting the community's opinions especially on:
  - LRS specification
  - Man-power, team organization (*offer of participation is very much welcome!*)
  - Discrimination of the important science goals in 2018 and later (also required instrument specifications to perform the goals)

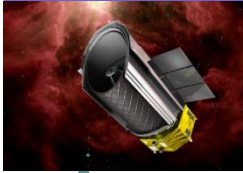


**SCI**



# Issues for SCI (1)

- Outstanding Scientific Uniqueness
  - Direct IR spectroscopy of Low-temperature (not young) giant exo-planets
    - What impact does this put on the research of planetary system formation?
    - What is really important scientific topics in 10 years later?
    - Do we give-up to observe ice-planets?
  - Specialist on the atmosphere of giant planets in our Solar system should be included in the discussion (by Nakagawa-san)
  - Debris Disk: very unique if we can observe young, warm, small exo-planets (by Ito-san)

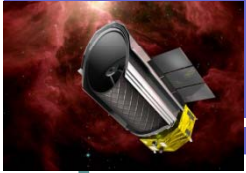


## Issues for SCI (2)

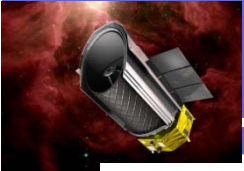
- What is `baseline' specification?
  - No Tip-tilt is the baseline
  - **No DM? with a (concise) DM?**
  - Wavelength coverage
    - Science Beyond 20um – need to be investigated, be careful before dropping
    - Shorter coverage? (water ice, by Honda-san)
  - Aperture masking
    - Not baseline function, but worth to consider more
  - **No DM (i.e.  $10^{-4}$  contrast) cannot be the baseline. More science/technical investigation is critically necessary.**
  
- Transit spectroscopy should be done by MCS, not by SCI ? (by Narita-san)

# Appendix1: trade off of DM format

DM format	Benefit of WFC	Required wires [num]	Required warm electronics poser (active/standby) [W]
6 x 6 (-4)	Only the core of the PSF is corrected (distance from the core $< 6/2 = 3 \lambda/D$ ), so <b>improvement of the contrast of the dark region of the PSF of the parent star is not expected.</b> Strehl ratio of both the parent star and PSF of planets is improved, so small benefit in sensitivity for planets is expected.	32 wires for each channels and 1 ground wire are required. Use of normal wires of SPCIA is realistic.	TBD, but much smaller than 60/16.
12 x 12 (-4)	Over the benefit of the case of 6 x 6 DM, inner area (closer than $12/2 = 6 \lambda/D$ to the PSF core) of the dark region of the PSF of the parent star is much darken by speckle nulling method (shown in Sec 3.6). Improved contrast in this limited area is roughly estimated to be $10^{-5} - 10^{-6}$ .	140 wires for each channels and 1 ground wire are required. Use of normal wires of SPCIA may be possible. Otherwise, the film print cable can be useful.	TBD, but smaller than 60/16.
32 x 32 (-4)	Over the benefit of the case of 12 x 12 DM, <b>wide dark region (<math>32/2=16 \lambda/D</math>) is expected to be better than <math>10^{-6}</math>.</b> Better than $10^{-6}$ contrast was partly demonstrated in a laboratory (Sec. 3.6).	1020 wires for each channels and 1 ground wire are required. Use of normal wires of SPCIA may be impossible. Development of the film print cable is important	60/16.



# **FPI REVIEW – PRIORITIZATION OF FUNCTIONS**



# Prioritization of Functions

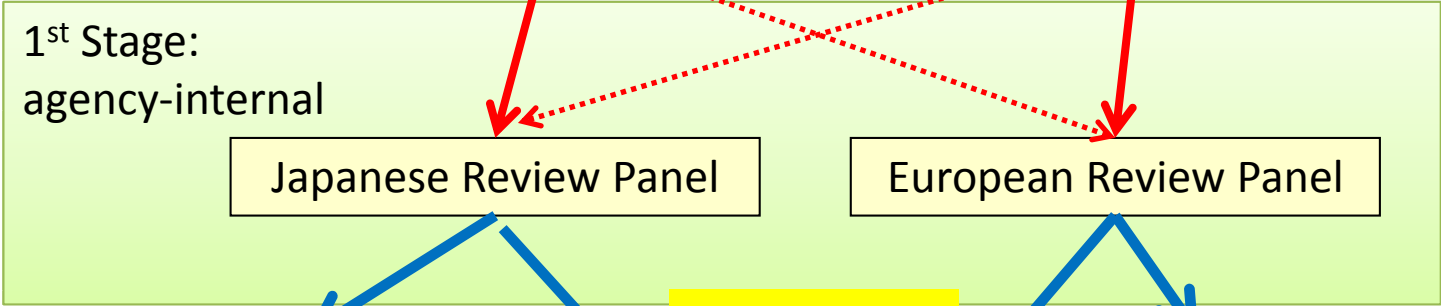
- The current concept study results in marginally consistent with 'plan B' resource allocation
  - Need prioritization to determine the final set of FPIs consistent with system resources
- Mandatory functions recommended in July, 2010 (excl. FPC):
  - MCS-WFC-S
  - MCS-WFC-L
  - MCS-MRS-L
  - (MCS-LRS-L )
- Optional functions in July 2010 (excl. FPC)
  - MCS-HRS-L (top priority among the options)
  - SCI
  - MCS-MRS-S
  - MCS-LRS-S
  - MCS-HRS-S

Do they need to be reconsidered?

Updated 14<sup>th</sup>  
Dec. 2010

Japanese/Korean  
Input Data Package

European Input  
Data Package

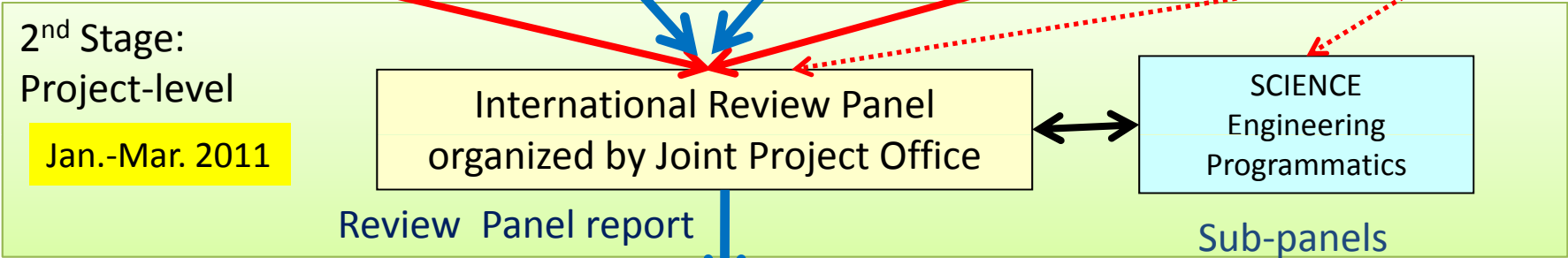


End Dec. 2010  
Review report

Update Japanese /Korean  
Data Package

Update European  
Data Package

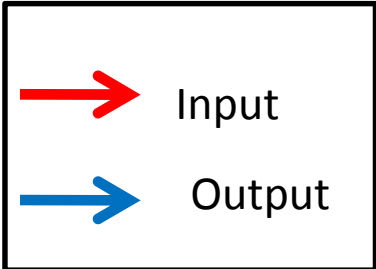
US Input Data  
Package (tbc)



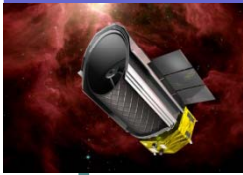
Review Panel report

Sub-panels

Updated Data Package (incl. review report by JPO)







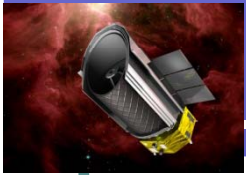
# For Reviewers...

- 各審査員からの最終意見レポート提出をお願いします。  
ここに参加した審査員にはぜひお願いします!
- 〆切: **12月22日(水)**
- 提出先: 市川STF委員長
- 内容:
  - 各装置(機能)の優先順位について(FPC含まない)
  - 各装置提案書毎に、改善すべき点等の提言を(これにはFPCも含めて)
  - SAFARI、US装置についても、特に日本・観測装置との関係を見て、ご意見あればお願いします。
  - できれば、**英語**でお願いします。量は問いません。
- 「小委員会」で検討の上、24日(目標)に各FPIにレポートを出したい。



# ToC of Japanese 1<sup>st</sup> Stage Panel Report (preliminary)

- 市川コメント
    - 最終レポートはプリプロジェクトチームの名でまとめるのか、STFとの共著でまとめるのかによって性格がだいぶ異なったものになるかと思います。
  - 共著の場合には、
    - 1. 審査の経緯(1頁)
    - 2. 最終提案書による各装置の概要(各装置1頁程度)
    - 3. 評価(各装置1-2頁程度)
      - 期待されるサイエンス 機能の優先順位・課題
    - 4. 装置の最終提案(1頁)
    - appendix 装置提案書(WSの議論を踏まえて最終改訂)
- を考えています。まずsub委員会ですべて、STFとプリプロジェクトチームに展開する手順ではいかがでしょうか。国際審査はプリプロジェクトチームがリーダーシップを取る必要があるかと思います。そのために、上記の最終レポートをベースに国際審査に展開するための形に整理してもよいかもしれません。



## For FPI teams..

- Final updates of the proposals for the International Review
  - Due: 14<sup>th</sup> Jan., 2011 (tbc)