Outline of The Flight Simulator for Research and Development (FSCAT)

**FSCAT-R (Rotorcraft)**
回転翼機型コックピットシステム

**FSCAT-A (Airplane)**
可動式固定翼機型コックピットシステム

**FSCAT-E (Emulation)**
エミュレーション・コックピットシステム

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A Flight Simulator is a system which enables us to operate a virtual aircraft. This kind of system simulates a real flight by displaying appropriate information to the pilot. Simulators are often used for research and aircraft development.

The Flight Simulator of JAXA has been used for various researches, such as evaluation of a new aircraft, development of new avionics and new operational procedures, and aviation human factors.

The main characteristics of our flight simulators is “High Flexibility”. We have three kinds of cockpits, and multiple mathematical aircraft models. Therefore, if it is needed, we can rearrange the simulation environment for each experiment.

Furthermore, in cooperation with research aircraft, Integrated flight experiments are feasible.
## SPECIFICATIONS

### Cockpit Systems

| Type   | Control Loadings | Visual Display Systems | Instrument Display Systems | Motion Systems |
|--------|------------------|------------------------|---------------------------|----------------
| FG50F-A| Electric, Column, Wheel, Pedal | 8 inch WCG (FW/124 VS/56deg) | 15 inch LCDx4 | Hydraulics |
| FG50F-R| Electric, Column, Pedal | 8 inch Front Projection Head Mounted Display (FW/114 VS/45deg) | 15 inch LCDx2 | Electric |

#### Image Generator

- **Type**: REScene 15-350 x3
- **Graphics Card**: NVIDIA Quadro FX5800G
- **Resolution**: 2560x1440 (1440x1050)
- **Channel**: 14Ch (6Ch+8Ch+1Ch)

#### Flight Dynamics Computer

- **Type**: Hiawatha x3
- **CPU**: Intel Xeon 2.3 GHz x4
- **Real-Time Controller**: RedHawk Linux 2.2

### Visual Data Base Areas

- Cheeth Field
- Tail-Echo Model Purpose Aeropark
- Takamatsu International Airport
- Aomori Airport
- Narita International Airport
- Kansai International Airport
- Nagoya Airfield
- Okinawa Fire-Fighting Helipad
- Lake Suwa

### Aircraft Models

- Do-28B (MuPAL-o)
- Cessna 172
- Fokker 100
- MA-002A (MuPAL-d)
- BK-117
- AU-32

### Motion Systems

<table>
<thead>
<tr>
<th>Structure</th>
<th>Hydraulic</th>
<th>Electric</th>
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<tbody>
<tr>
<td>DOF</td>
<td>6DOF</td>
<td>6DOF</td>
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<tr>
<td>Max Accl</td>
<td>9.4m/s²</td>
<td>4.9m/s²</td>
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<tr>
<td>Translation</td>
<td>+/−3.6m</td>
<td>+/-3.6m</td>
</tr>
<tr>
<td>Roll/Heading</td>
<td>+/-30deg</td>
<td>+/-30deg</td>
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### Tools&Softwares

- CRW: Airplane Model Construction Tool
- BAC: Flight Characteristics Analysis Tool
- FSPK: Simulation Program Structure & Libraries
- MLEP: Compiler & Linker
- MSIP: Realtime Manager, Monitor and Debugger
- GIS: Data Handler and Viewer
- GV: 3D-Graphical Viewer