Freelance
The easy-to-use distributed control system

Ruchiman Priatna (Control Technology)
What is Freelance?

<table>
<thead>
<tr>
<th>Distributed control system</th>
<th>Freelance Engineering</th>
<th>Freelance Operations</th>
</tr>
</thead>
<tbody>
<tr>
<td>Scalable structure</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Engineering Tool</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Fieldbus management</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Operator Station</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Controller &amp; I/O</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Why use Freelance?</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Evolution &amp; Migration</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Applications AC 800F</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Applications AC 700F</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Freelance vs. PLC+HMI</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sales &amp; Marketing</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Summary</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Freelance is a Distributed Control System made up of these components:

- Engineering Tool
- Operator Station
- Controller
- Controller

AC 700F
AC 800F
AC 900F

+ I/O’s
S700
S800
S900
The New Controller AC 900F
More power, more speed, more functionality …

- Award winning in design
- Attractive in price and with more power
- More connectivity – 4 Ethernet ports and Modbus TCP
- Built-in SD card for backup/restore
- Profibus Master with line redundancy (built-in RLM01)
- Even non-redundant AC 900F supports full Ethernet redundancy (with Freelance 2015)
What’s special about Freelance? Smallest footprint Hardware and Software wise

- Distributed control system
- Scalable structure
- Engineering Tool
- Fieldbus management
- Operator Station
- Controller & I/O
- Why use Freelance?
- Evolution & Migration
- Applications AC 800F
- Applications AC 700F
- Freelance vs. PLC+HMI
- Sales & Marketing
- Summary

**Software**

**One common SW setup for whole DCS**
- Engineering Tool
- Operator Interface
- Controller Emulator
→ All on one PC

**Hardware**

- Installation in approx. 5 minutes
- Standard Office PC can be used (could run on your notebook)
- Just Windows, no 3rd party SW needed
- Train yourself with Quick Start DVD (Computer Based Training)
Freelance
Focus on Ease of Use

- Easy to learn
- Easy to handle
- Pre-engineered
- Easy to extend

Distributed control system
Scalable structure
Engineering Tool
Fieldbus management
Operator Station
Controller & I/O
Why use Freelance?
Evolution & Migration
Applications AC 800F
Applications AC 700F
Freelance vs. PLC+HMI
Sales & Marketing
Summary
Example for Pre-Engineered in Freelance
Freelance
Maximum availability - Redundancy

- **Redundancy**: duplication of critical components to increase availability and avoid production downtime
- No single point of failure

Freelance hardware can be structured redundantly at all levels:
- System bus (Standard Ethernet)
- Controller
- Input / output modules
- Fieldbus master / lines
- Linking devices
- Operator Stations (just have 2 or more)
Freelance
Scalable Architecture

Start with Freelance
- Start with as few as 10 I/Os + just 1 controller connected to one PC running with Freelance Engineering and Operations

Grow easily later by adding...
- ... I/Os to existing Controller
- ... another Freelance Operator Station
- ... another Controller
- ... redundancy
- ... Fieldbus
- ... Batch, Information Management
- ... Extended Operator Workplace
Freelance Engineering
One tool for all

- Graphics configuration for Freelance operator station
- IEC 61131-3 programming languages
- Graphic macro library with more than 200 symbols
- Function block library

- Hardware and software configuration
- Integrated fieldbus management
- Online downloads and commissioning
- Cross-referencing of signals system wide
Freelance Engineering Programming Languages

Choose your IEC 61131-3 language

- Function block library
- 220 function blocks, many of them connected to predefined faceplates
- Sequential Function Chart
- Instruction List
- Ladder Diagram
- Structured Text
- Function Block Diagram

Why is that good?

- Each language has it’s strengths.
- Different editors are preferred by different users.
- User can choose preferred language.
Fieldbus Management in Freelance

- Built-in Fieldbus support for
  - PROFIBUS
  - Fieldbus FOUNDATION
  - HART
  - MODBUS and others
- Covers bus and device configuration
- Setting fieldbus topology and parameters
  - E.g. transmission rates and addresses
  - Scan bus for new devices
- Easy configuration and diagnostics of field devices with FDT-technology
Fieldbus Management in Freelance
How to solve this complex scenario?

→ 10 Device Suppliers
→ 100 Device Types
→ 10.000 I/O’s

Each of these devices require…

- Configuration, parameterization
- System integration
- Easy solution with Freelance
  - Integrated fieldbus management
  - FDT technology
FDT/DTM
Benefits and Opportunities

- Open, standardized interface
  - Supported by major intelligent device vendors
- Proven by end users
- FDT enables device vendor to write applications (DTM's) fitting best to their device
- Efficient fieldbus and device management
  - Similar device types (e.g. Pressure) are presented in engineering tool with same style, reducing engineering effort
- Free choice of device and systems for users
- Consistent engineering data
- Support of full device functionality
- Plug and play
Freelance Operations

- Easy Operation & Diagnostics of entire system
- Redundancy with 2 or more DigiVis Stations
- Offers many visualization options:
  - Dual monitor operation
  - Free graphic displays
    - Standard graphic elements
    - Bitmaps, 3D macro library
  - Clearly structured faceplates for operator interventions including group displays
  - Trend displays including historian
Freelance Operations
More visualization options

Automatically generated system displays for

- Hardware diagnostics
- Alarm pages for specific plant areas
- Sequence control displays
- Shift logs
- Event logs
- Excel reports
- Data archiving
Why use Freelance?

- Evolution & Migration
  - Applications AC 800F
  - Applications AC 700F
  - Freelance vs. PLC+HMI
- Scalable structure
- Distributed control system
- Engineering Tool
- Fieldbus management
- Sales & Marketing
- Summary

Freelance Operations
Standard Trend Archives

- CSV File - Import in Excel
- Use Archive Browser Tool
  - To view archived trends + logs
  - To convert to CSV format
- 1 file per trend display
  - On each OS HD → redundant when 2 OS
  - 6 process values per file

Engineering Operations Operations

<table>
<thead>
<tr>
<th>Name</th>
<th>Size</th>
</tr>
</thead>
<tbody>
<tr>
<td>Temp_Light.D01</td>
<td>240,677 KB</td>
</tr>
<tr>
<td>TREND.R701_001</td>
<td>37,571 KB</td>
</tr>
<tr>
<td>NZ_Trend.001</td>
<td>11,139 KB</td>
</tr>
</tbody>
</table>
Freelance Controller
AC 900F

- Typically up to 1500 I/Os
- Redundancy for high availability
- Optional display for easy diagnostics
- Up to 10 direct I/O modules
- Support SD card for firmware update and application backup & restore

Connectivity
- 2 x Profibus DPV1
- HART
- Modbus TCP & RTU
- Telecontrol Protocol (IEC 60870-5-101 /104)
- G3 compliant as standard
Freelance Controller
AC 800F

- **PM 803F:**
  - Typical up to 1000 I/Os
- **Redundancy for high availability**
- **Fieldbus support**
  - Profibus
  - Foundation Fieldbus
  - HART
  - Modbus TCP & RTU
  - CAN for Freelance Rack I/O
  - Hot swap of Fieldbus modules
  - Telecontrol Protocol (IEC 60870-5-101 /104)
- **AC 800F coated (G3 compliant)**
  - hardware components available
Freelance Controller
AC 700F

AC 700F Controller

- I/O scan time of 2ms possible
- CPU capacity for 300 I/O’s
- Support SD card for firmware update and application download/upload
- Temperature range: 0…60 °C
- Monitoring of channels:
  - Short circuit & line break
- CPU PM 783F:
  - Front panel display for easy diagnostics
  - 1 Ethernet port (10 / 100Mbit) – Modbus TCP and Telecontrol
  - 1 Profibus Master
  - 1 RS-232 / 485 port – Modbus
  - 1 RS-232 port - extended diagnostic
- AC 700F attracts PLC users to use DCS
## Freelance Controller Summary (Improvements of F2013 in blue)

<table>
<thead>
<tr>
<th>Parameter</th>
<th>AC 700F</th>
<th>AC 800F</th>
<th>AC 900F</th>
</tr>
</thead>
<tbody>
<tr>
<td>CPU Redundancy</td>
<td>-</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>SD card support</td>
<td>✓</td>
<td>-</td>
<td>✓</td>
</tr>
<tr>
<td>Profibus Master modules</td>
<td>1</td>
<td>4</td>
<td>2</td>
</tr>
<tr>
<td>CAN Bus modules</td>
<td>-</td>
<td>1</td>
<td>-</td>
</tr>
<tr>
<td>FF HSE modules</td>
<td>-</td>
<td>4</td>
<td>-</td>
</tr>
<tr>
<td>Modbus RTU ports</td>
<td>1</td>
<td>8</td>
<td>2</td>
</tr>
<tr>
<td>Modbus TCP ports</td>
<td>1</td>
<td>2</td>
<td>4</td>
</tr>
<tr>
<td>IEC 60870-5-101 ports</td>
<td>1</td>
<td>8</td>
<td>2</td>
</tr>
<tr>
<td>IEC 60870-5-104 ports</td>
<td>1</td>
<td>2</td>
<td>4</td>
</tr>
<tr>
<td>Direct IOs</td>
<td>✓ 8 modules</td>
<td>-</td>
<td>✓ 10 modules</td>
</tr>
<tr>
<td>Typically IOs per controller</td>
<td>250</td>
<td>400/1,000</td>
<td>1,500</td>
</tr>
<tr>
<td>Ambience temperature</td>
<td>0 – 60 °C</td>
<td>0 – 60 °C</td>
<td>0 – 60 °C</td>
</tr>
<tr>
<td>G3 compatible</td>
<td>-</td>
<td>optional</td>
<td>standard</td>
</tr>
</tbody>
</table>
Freelance I/O
S700 - Direct I/Os for AC 700F and AC 900F

- Full range of signal types including AI, AO, DI, DO, Temp, Pulse, Frequency, Relay
- Inputs and outputs mixed in one module!
- Easy integration of up to 8 direct I/O modules per AC 700F and up to 10 modules per AC 900F controller
- Terminal units available as
  - Spring type or
  - Screw type
- **Highlight:**
  - DA 701 is all in one
    - DI & DO
    - AI & AO
What Characterizes Freelance?  
The 9 E’s!!

1. Easy to **Install** – Less than 5 minutes
2. Easy to **Learn** – Less than a week
3. Easy to **Understand** – Available in your language
4. Easy to **Engineer** – Everything using one tool
5. Easy to **Backup** – Entire application is just one file, fits on a small memory stick
6. Easy to **Scale** – Grows on a linear scale
7. Easy to **Demo** – Runs on any notebook
8. Easy to **Sell** – Customers love it and finally
9. Easy to **Make Money**
   Customer focus on running production rather than on system maintenance
Why use Freelance?

Freelance is very successful in:

- Small to medium/large sized applications in:
  - Oil & gas
  - Chemicals
  - Minerals / Cement
  - Consumer goods (Sugar)
  - Oleochemical

Freelance fits perfect for projects

- < 10 Operator stations
- < 5,000 I/O signals

Simple handling, attractively priced hardware and software
Why use Freelance?

- Central access to all field information
- Field devices completely integrated into control system engineering
  - Only one tool for engineering, commissioning and diagnostics
- Save money in
  - Engineering
  - Commissioning
  - Testing
  - Service and maintenance
- Assembly close to the field
  - Reduction of field wiring and space requirements
- All components match and are optimized to work together
Evolution Steps/Product News
Features V9.1 → V9.2

- AC 700F controller now supports Profibus–like AC 800F
- AC 700F performance enhancements
- S700 direct I/O with 7 different module types
- PLC-connect for DigiVis operator station
- Excel Reports for DigiVis
- Bulk Data Manager Tool for even more efficient engineering in Freelance
Evolution Steps/Product News
Features V9.1 → V9.2

- Profibus Remote I/O S700
- 14 different module types
- Solution for nearly every electrical signal
- More scalability
New AC 900F controller (redundancy, SD card, 10 direct I/O, new protocols…)

Freelance controllers (AC 700F, AC 800F and AC 900F) support Modbus via Ethernet (TCP/IP)

Freelance controllers (AC 700F, AC 800F and AC 900F) support Telecontrol protocol on Ethernet (IEC 60870-5-104)

AC 700F performance enhancements

AC 700F SD card support

Additional S700 direct I/O

S800 high density I/O

Freelance Engineering (CBF) enhancements
Liquefied petroleum gas (LPG) recovery + process
- 1 x Control Builder F Engineering Station
- 2 x DigiVis operator stations
- 1 x redundant AC 800F controller
- 1 x S800 remote I/O station, ca. 200 I/O signals
- Linking Device 800HSE, ca. 70 I/O signals
  Foundation Fieldbus

Styrene production
- 1 x Control Builder F Engineering Station
- 6 x DigiVis operator stations
- 2 x redundant AC 800F controllers
- 22 x S800 remote I/O stations, ca. 3,000 I/O signals
Mineral applications

Pelletizing plant to process and export iron
- 2 x Freelance Engineering workstations
- 4 x Process Portal operator workplaces
- 14 x redundant AC 800F controllers
- S800 I/O remote I/O stations, ca. 10,000 I/O signals

Cement Factory
- 3 x Freelance operator stations
- 2 x AC 800F controllers
- S800 remote I/O station, ca. 1,000 I/O signals
Consumer applications

Sugar Refinery
- 1 x Freelance engineering station
- 12 x Freelance Operator Station
- 5 x AC 800F controllers
- 4,400 Rack I/O signals

Animal food production from Sugar Canes
- 2 x 2 Freelance operator station
- 1 x AC 800F controller
- S800 remote I/O stations, 700 I/O signals
- 800xA Batch management
Other applications

**Steel production**
- 1 x Freelance engineering station
- 6 x Freelance operator stations
- 2 x redundant AC 800F controllers
- 3 x single AC 800F controllers
- 2,000 I/O Rack I/Os

**Bio Diesel Plant**
- 1 x Freelance engineering station
- 3 x Freelance operator stations
- 2 x redundant AC 800F controllers
- S800 remote I/O station, 1,500 I/Os
Other applications

**Renewable Energy Power Plant**
- 1 x Freelance engineering station
- 6 x Freelance operator stations
- 5 x redundant AC 800F controllers
- S800 remote I/O stations, ca. 3,000 I/O signals

**Waste Water Treatment**
- 1 x Freelance engineering station
- 3 x Freelance operator stations
- 3 x redundant AC 800F controllers
- S800 remote I/O stations, ca. 900 I/O signals
Power and productivity for a better world™